JANUARY 11, 1941

Medical Library

JAN 27 1941

THE LANCET

Offices: 7, ADAM STREET, ADELPHI, W.C.2.

Telegrams: LANCET, RAND, LONDON. Telephone: TEMPLE BAR 7228 and 7229.

No. II. OF VOL. I., 1941. LONDON, SATURDAY, JANUARY 11, 1941. Pp. 88—Price 1s.
No. 6124. VOL. CCXL. Founded 1823. PUBLISHED WEEKLY. Registered as a Newspaper. Annual Subscription: Inland £2 2s. Abroad £2 10s.

2nd Edn. 490 pp. 14 Plates. 297 Illus. 30s. net; post. 8d.

CYSTOSCOPY AND UROGRAPHY.
By JAS. B. MACALPINE, F.R.C.S.
"A credit to British surgery."—BRIT. JNL. OF SURGERY.
Bristol: John Wright & Sons Ltd. London: Simpkin Marshall Ltd.

PROBLEMS OF

ANÆSTHESIA
IN GENERAL PRACTICE
By D. H. LUKIS, M.D., B.S.Lond.,
Late Hon. Anæsthetist, South London Hospital; late Clinical Assistant, Ear, Nose, and Throat Department, Queen's Hospital for Children; Hon. Medical Officer, Kingston Victoria Hospital.
Demy 8vo. 7s. 6d. net (postage extra). 158 + vi pages.
Hodder & Stoughton Ltd., 20, Warwick-square, E.C.4.

DISEASES OF THE THYROID GLAND.
WITH SPECIAL REFERENCE TO THYROTOXICOSIS.
By CECIL A. JOLL, M.S., B.Sc., F.R.C.S. (Eng.).
Crown 4to. Fully Illustrated. £3 3s. net.
"Mr. Joll has presented his fellow practitioners and students with a monumental volume. They need not trouble to search the literature published up to the time this volume went to press, for they will find everything relevant within its covers."
—BRITISH JOURNAL OF SURGERY.
William Heinemann (Medical Books) Ltd., 99, Great Russell-street, London, W.C.1.

9 Plates and 135 Text Illustrations. 15s. net; postage 6d.
DISEASES OF THE

EAR, THROAT AND NOSE.
By J. DOUGLAS McLAGGAN, F.R.C.S. Eng. and Edin.
London: H. K. Lewis & Co. Ltd., 136, Gower-street, W.C.1.

PUBLISHED 10TH OCTOBER, 1940
LANCET WAR PRIMER

WOUND INFECTION
Edited by W. H. OGILVIE
96 pp. 2s. 6d. net Plus 3d. postage
THE LANCET Ltd., 7, Adam-street, Adelphi, W.C.2

In Two Volumes. SELECTED WRITINGS OF

JOHN HUGHLINGS JACKSON.
M.D., F.R.C.P., F.R.S.
I.—EPILEPSY AND EPILEPTIFORM CONVULSIONS.
II.—EVOLUTION AND DISSOLUTION OF THE NERVOUS SYSTEM: SPEECH: VARIOUS PAPERS: ADDRESSES AND LECTURES.
Edited by JAMES TAYLOR, M.D., F.R.C.P.
With the advice and assistance of GORDON HOLMES, M.D., F.R.C.P., and F. M. R. WALSHE, M.D., F.R.C.P.
Over 500 pages in each vol. Price 25s. net each; postage extra (inland 9d., abroad 10d.).
Hodder & Stoughton Ltd., 20, Warwick-square, E.C.4.

ANATOMY IN THE LIVING MODEL.
By DAVID WATERSTON, M.A., M.D., F.R.C.S.E., F.R.S.E.,
Bute Professor of Anatomy at the University of St. Andrews.
276 pages. 74 Illustrations. 16 Coloured Plates. Price 15s. net; postage 9d.
". . . can be read and re-read by the student, general practitioner, the surgeon and physician."
—ST. BARTHOLOMEW'S HOSP. JOUR.
Hodder & Stoughton Ltd., 20, Warwick-square, E.C.4.

Second Revised Edition. 82 Illustrations. 30s. net.

CANCER OF THE BREAST
AND ITS TREATMENT.
By W. SAMPSON HANDLEY, M.S., F.R.C.S.
John Murray, Albemarle-street, W.

RADIOTHERAPY IN THE DISEASES OF WOMEN.
By MALCOLM DONALDSON, B.A. (Cantab.), F.R.C.S. (Eng.), M.B., Ch.B. (Cantab.)
Physician Accoucheur with Charge of Out-patients, St. Bartholomew's Hospital; Consulting Gynæcologist, Royal Northern Hospital, &c.
Demy 8vo. 148 pages. 11 Illustrations in the Text; 2 Plates, one in Colour. Price 7s. 6d. net; postage 7d.
Hodder & Stoughton Ltd., 20, Warwick-square, E.C.4.

Free to the Medical Profession on request. Cloth bound Ed. 5s.

ARTIFICIAL LIMBS.
"SOLVITUR AMBULANDO."
A Symposium on Prosthetic Achievement.
Pp. 72. 37 Coloured Plates.
"I congratulate you on this interesting, instructive, and artistic production. I consider it to be a very great addition to my library."—M.B., Ch.B., F.R.C.S.
J. E. Hanger & Co., Ltd., 7, Roehampton House, Roehampton, S.W.15.

AN AYLESBURY BROADSIDE
Now Ready. From all Booksellers. Price 3d.
Setting out, from the medical standpoint, the grounds, social, economic and physiological, for the immediate grant of family allowances on a national scale.
The Lancet Limited, 7, Adam-street, Adelphi, London, W.C.2.

THE CLINICAL INTERPRETATION OF AIDS TO DIAGNOSIS.
Vols. I and II. Price 10s. 6d. each. Postage extra.
Volume I.—"Each of the 45 Sections included in the book is contributed by an experienced worker. . . ."
Volume II.—"We may say that the success of the first volume is here repeated. . . ."—BRITISH MEDICAL JOURNAL.
"Physicians and surgeons cannot afford to omit the knowledge here outlined. . . ."—BIRMINGHAM MEDICAL REVIEW.
The Lancet Limited, 7, Adam-street, Adelphi, London, W.C.2.
Pp. 328 + xii. 12s. 6d. net.

INTRODUCTION TO

DISEASES OF THE CHEST.
By JAMES MAXWELL, M.D. (Lond.), F.R.C.P. (Lond.).
Hodder & Stoughton Ltd., 20, Warwick-square, E.C.4.

PROGNOSIS. VOLS. ONE AND TWO
Price 10s. 6d. each net (postage 7d. each extra).
Companion Volumes to the "Modern Technique in Treatment" and "Clinical Interpretation of Aids to Diagnosis" Series.
The 124 articles of the series have been collected in book form in two volumes, which are fully indexed under titles, authors, and broadly classified into groups to facilitate quick reference.
The Lancet Limited, 7, Adam-street, Adelphi, London, W.C.2.

Second Edition. Pp. 190 + viii. 6s. net. Recently Published.

PRINCIPLES OF MEDICAL STATISTICS
By A. BRADFORD HILL, D.Sc., Ph.D.
The Lancet Limited, 7 Adam-street, Adelphi, London, W.C.2.

New Books For The New Year

NOW READY. 97th Annual Issue. 2,464 Pages. 64,304 Names. 42s.

THE MEDICAL DIRECTORY ★ 1941
London Provinces Wales Scotland Ireland Abroad Navy Army and Air Force
"There is something of interest for every practitioner in this volume, which has become an indispensable part of the medical practitioner's equipment."—The Practitioner.

PRACTICAL PUBLIC HEALTH PROBLEMS
By SIR WILLIAM SAVAGE, B.Sc., M.D., Examiner, Universities of London and Wales. 10s. 6d. (This Month)

CUSHNY'S PHARMACOLOGY AND THERAPEUTICS
New (Twelfth) Edition. By C. W. EDMUNDS, M.D., Professor of Materia Medica and Therapeutics, University of Michigan; and J. A. GUNN, M.D., F.R.C.P., Nuffield Professor of Experimental Therapeutics, University of Oxford. 66 Illustrations. 30s.

APPLIED PHARMACOLOGY
By A. J. CLARK, *M.C.*, M.D., F.R.C.P., F.R.S., Professor of Materia Medica and Pharmacology, University of Edinburgh.
New (Seventh) Edition. 92 Illustrations. 21s.

DISEASES OF INFANCY AND CHILDHOOD
By WILFRID SHELDON, M.D., F.R.C.P., Physician for Diseases of Children, King's College Hospital; Physician to Out-patients, The Hospital for Sick Children, Great Ormond Street, London.
New (Third) Edition. 130 Text-figures and 14 Plates. 24s.

J. & A. CHURCHILL Ltd., 104 Gloucester Place, LONDON W.1

NEUROSES IN WAR TIME

ELIXIR GABAIL

. . . . . allays anxieties, doubts and fears, and relieves mental stress engendered through heightened tension and increased nervous strain.

Dose : One tablespoonful twice or thrice daily

Supplied in bottles of 187 c.c. and in bulk for Hospital use

THE ANGLO-FRENCH DRUG CO. LTD., 11 & 12, Guilford Street, LONDON, W.C.1

SURGICAL, CORRECTIVE, AND ALL FORMS OF SPECIAL FOOTWEAR

Recommend D & M to your patients whenever they are in trouble with their feet. Good footwear *properly fitted* is essential. D & M have been personal and professional bootmakers to Medical Men during 116 years.

Special terms are available for wounded Officers and Men

DOWIE & MARSHALL LIMITED (CIVIL, MILITARY AND SURGICAL CORDWAINERS, POSSESSING 116 YEARS' REPUTATION)

16, GARRICK STREET, COVENT GARDEN, W.C.2

INCORPORATING A. MISTEL & SON TEMPLE BAR 5587

D&M LONDON·1824

Specially designed for use in the treatment of **Pneumonia, Bronchitis, Pleurisy** *and similar affections of the Chest and Lungs.*

Made from the superfine grade of "Gamgee" tissue, made exclusively by Robinsons of Chesterfield and reputed as the finest dressing for use in Thermal treatment. Invented by, and prepared exactly according to the direction of the late Sampson Gamgee, F.R.S.E., Consulting Surgeon to the Queen's Hospital, Birmingham. Made in six sizes. 9½d. to 3/-. Obtainable from all Chemists.

"Gamgee Tissue" REGD. TRADE MARK

PNEUMONIA **JACKET**

SOLE PROPRIETORS & MANUFACTURERS: ROBINSON & SONS LTD. OF CHESTERFIELD & 168 OLD ST., LONDON, E.C.1

LAXAROL

TABLETS

FOR THE PHYSIOLOGICAL TREATMENT OF CONSTIPATION

CONTAINING

BILIARY AND INTESTINAL SECRETIONS WITH AGAR AGAR AND LACTIC FERMENTS

WILLOWS, FRANCIS, BUTLER & THOMPSON, LTD.

Telephone: CLISSOLD 6361 73, 75, and 89a, SHACKLEWELL LANE, LONDON, E.8 *Telegrams:* "FORTY, HACK, LONDON"

ORIGINAL ARTICLES

ÆTIOLOGY OF POLYNEURITIS[1]

By F. M. R. WALSHE, D.Sc., M.D.Lond., F.R.C.P.
PHYSICIAN TO THE NATIONAL HOSPITAL QUEEN SQUARE

IN polyneuritis neurology makes contact with living medicine at one of its most active points of growth, and exemplifies the need for close and maintained collaboration in the study of human disease between laboratory and clinical workers.

Few titles in medicine are in greater need of definition than polyneuritis. It is the custom to give in textbooks a long list of substances that give rise to this malady, including toxins and chemical substances in great numbers. In a recent review on vitamin B_1 deficiency and polyneuritis (Aring and Spies, 1939) I find 12 virus diseases, 21 bacterial infections, and 24 chemical substances all listed as causes. Of this total of 57 agencies I doubt if more than 10 can really be incriminated. It is clear, therefore, that these authors have a different conception of polyneuritis from that my own experience and reading have led me to form. By polyneuritis—or, to give it its full and original title, multiple symmetrical peripheral neuritis—I mean a bilaterally symmetrical affection of the peripheral nerve trunks to the limbs involving both motor and sensory fibres. In some instances cranial nerves, particularly the seventh, may be involved. The occasional presence of symptoms of mental disorder indicate that the central nervous system is not immune, but these symptoms are the only sign of sueh central involvement. Accompanying this reaction of the nervous system there is always some myocardial involvement.

It is to this nervous and myocardial reaction that the name polyneuritis should be restricted. A clinical picture so striking and so familiar, with a pathological basis so constant, is entitled to a category by itself. To this we cannot reasonably admit many of the intoxications commonly grouped with it. Lead poisoning, for example, affects the central nervous system, both the brain and the motor cells of the cord; it also affects certain motor nerves and muscles. Its clinical picture and its morbid histology are not those of polyneuritis. Carbon disulphide poisoning is a comparable intoxication having the widest action upon the nervous system, but not producing the picture of multiple symmetrical peripheral neuritis, and its lesions are not those of this malady. Even when such infections and intoxications are excluded a diversity of agents are left capable of giving rise to polyneuritis as now d fin d.

The uniformity of signs, symptoms and behaviour seen throughout the range of ætiological varieties is striking—a uniformity that reflects the nature of the pathological lesions characteristic of the malady. This does not mean that there are no variations between case and case, or between one ætiological variety and another, but that there are no quali ative differences. In all there are signs of impaired function of peripheral nerves and heart muscle, and the differences are best exemplified by taking three main clinical varieties and giving ætiological samples of each: an acute or fulminating variety, "acute febrile polyneuritis" or "acute infective polyneuritis"; a subacute variety of which diphtheritic paralysis is an example; and a chronic variety of which the alcoholic is the familiar type.

In the acute infective variety, the onset is acute, the paralysis may be profound and may invade trunk muscles as well as those supplied by the facial nerves; sensory involvement is minimal. The course is rapid, ending fatally within a few days or leading to a relatively quick resolution and recovery. In the subacute variety the trunk muscles and the facial muscles often escape, the paralysis is less severe, but sensory loss is greater; recovery is a matter of weeks or months. In the chronic variety, evolution is very slow, more wasting and a greater likelihood of contractures are seen, while recovery is tedious and may well run over a year. Yet when all these differences have been duly emphasised, there is in all the same atrophic flaccid paralysis of lower motor neurone types with loss of tendon jerks, sensory loss of the peripheral type and the possibility of recovery. In all types there may be some mental disorder—a muttering delirium in fulminating cases, and Korsakow's psychosis in the less acute varieties. The pathological variations are of the same quantitative order. In the most acute cases, death or recovery ensue before irreversible structural changes have had time to take place and microscopically discoverable lesions are minimal; but in the chronic cases we see the characteristic Wallerian changes in the long peripheral nerve trunks. If any changes are present in the cerebrospinal fluid they are confined to an increase of protein.

There remains the invariable myocardial involvement so characteristic of this polyneuritis. It may be mild and expressed as a simple tachycardia, or extreme ending in sudden right-sided ventricular dilatation and fatal heart-failure. Indeed, in beri-beri the most acute cases present the picture of cardiac illness, and sometimes end fatally within a few days before any unequivocal symptoms of nervous disorder arise.

BERI-BERI

Polyneuritis, then, represents a uniform reaction of nervous system and heart muscle to diverse and—at first sight—unrelated pathogenic agencies. These agencies range from a simple element such as arsenic to the complex exotoxins of diphtheria, and to such unrelated metabolic disturbances as diabetes and beri-beri. The contrast between the diversity of the agents and the uniformity of the response leads us to ask whether each of these agents acts directly upon nervous system and heart muscle, or whether they act indirectly in virtue of some common disorder of metabolism produced by them all. Can some single toxic metabolite be formed in the body which acts in each ætiological variety of polyneuritis as a direct nervous and myocardial poison?

The study of beri-beri has so far thrown most light upon this question. The lines along which research must travel were indicated at least twenty-five years ago, and that we are not yet in sight of the end is due to our failure to appreciate the importance of clinical and experimental observations made by the pioneers in the early years of the century.

Clinically and pathologically beri-beri is a typical polyneuritis, differing in no essential from other varieties. The nervous signs and symptoms are those of a multiple symmetrical peripheral nervous lesion, the cardiac manifestations are also those of polyneuritis and are constantly present, sometimes, as I have pointed out, dominating the clinical picture and determining the fate of the patient. Severe œdema may accompany some cases but does not alter the clear clinical and pathological picture. In the Malay States and Dutch East Indies beri-beri was found to occur in natives who subsisted on a diet consisting predominantly or wholly of polished rice—that is, a diet of carbohydrate. Fraser and Stanton (1911), by feeding fowls on polished rice, found that the birds developed in the course of three or four weeks a form of paralysis which they called avian polyneuritis or avian beri-beri. Fowls given nothing but water lived longer than the rice-fed birds and died without developing polyneuritis; they concluded therefore that "polyneuritis in fowls is not due to deprivation of food, but to deprivation of some particular element in polished rice." In other words, they found that two factors were operative: the presence of carbohydrate in the diet and the absence of something else. The more carbohydrate the birds were given, the more rapidly they developed polyneuritis. In the light of present knowledge it is clear that deprivation of vitamin B_1 alone was not a sufficient cause of beri-beri in fowls; nor is it, for that matter, in man since patients dying of anorexia nervosa do not develop polyneuritis. To speak of this vitamin as "antineuritic" is wholly erroneous except in relation to cases—human or avian—receiving a high carbohydrate diet. In other words, the significance of vitamin B_1 was in relation to carbohydrates, rather than to the nervous system.

1. A paper read before the Halton Medical Society on Dec. 13.

VITAMIN B_1 AND CARBOHYDRATES

Unfortunately, this adjective "antineuritic" soon gave rise to the notion that beri-beri was a simple matter of a degenerating nervous system deprived of some essential component of its structure. The fact that the human and the avian nervous system could be deprived of its vitamin B_1 with impunity when no carbohydrates were given was lost sight of. To the neurologist this simple deprivation hypothesis has always been unacceptable, for it ignored the cardiac symptoms and the essential identity, clinically and pathologically, of beri-beri with other ætiological vari ties of polyneuritis, and was in plain conflict with the facts ascertained by Fraser and Stanton and others. Recently it has been found by Peters that vitamin B_1 acts as a catalyst in the carbohydrate metabolism of the nerve-cell and the heart muscle, and we have at last come back to a more realistic conception of the problem. In the absence of vitamin B_1, cellular carbohydrate metabolism—so important to the nerve-cell—breaks down at the stage of pyruvic acid formation; this substance accumulates in the cell where its presence can be detected. A relationship of the vitamin to carbohydrate has now been established on chemical as well as physiological and clinical grounds, and the two lines of attack upon the problem have happily approached again.

Does such a breakdown in the carbohydrate metabolism of nerve and cardiac cells occur in all ætiological varieties of polyneuritis? If so, does it depend upon vitamin B_1 deficiency in the cell? Does such a deficiency arise from inadequate ingestion or from impaired absorption of vitamin? Is pyruvic acid possibly the toxic metabolite which I have postulated as the common direct poison in polyneuritis? No conclusive answer to these questions is yet possible. Peters says it would be an error to suppose that pyruvic acid is toxic, but the truth is that we cannot answer this question one way or the other.

There is another obvious gap in our knowledge, for like other varieties of polyneuritis, beri-beri owes its clinical nervous features to impaired function of peripheral nerve fibres. The occurrence of disturbed function in nerve-cells provides no explanation of the clinical picture, nor does it account for the severe degeneration of nerve-fibres found in long-standing cases. The cell lesions described in the brain of subjects dying with alcoholic polyneuritis are inadequate to account for peripheral nerve-fibre degeneration of the degree and in the situations in which it is found.

There is also a danger that we may be tempted to accept a misleading simplification of the problem, and it may be useful to indicate some of the difficulties in the way of the hypothesis of vitamin deficiency even when this is presented in a form theoretically applicable to all varieties of polyneuritis.

CASE-HISTORIES

A married couple in the late thirties were admitted to hospital under my care with a severe and typical polyneuritis. The man was a commercial traveller. Both he and his wife were total abstainers; both were well-nourished and had always had excellent health. Their dietary habits were sound, but since the man spent 5 days every week away from home, he and his wife only shared the same food at week-ends. Neither had had any immediately preceding illness, yet simultaneously both developed all the signs and symptoms of polyneuritis. Neither was febrile, or showed any constitutional upset; both retained their appetites. I examined them 8–10 days after the onset, and found that the optic discs and cranial nerves were normal. There was slight but appreciable weakness of the upper limbs, more severe distally, increased tenderness of the small hand and forearm muscles; arm-jerks abolished. Some impairment of all forms of cutaneous sensibility, least evident for pain and temperature, and some impairment of postural sense in the distal segments of the limbs. The legs were much weaker than the arms and there was double foot-drop. Neither patient could rise from the squatting position, though both could just walk when helped into the erect position. The calf and plantar muscles were tender and flaccid, the knee- and ankle-jerks were abolished, and there was sensory impairment to all forms up to the level of the knees. The pulse-rate at rest in both, 90 or over. The urine was normal. The cerebrospinal fluid was normal, save for a slight increase in total protein. No other abnormal findings. Of the two the husband was the weaker. Both patients, as commonly happens, got progressively worse for about three weeks, becoming unable to stand. In the following three or four weeks the signs were stationary, and after that there was gradual recovery which took nine months to complete.

In these two cases no known mode of infection or exogenous intoxication could be discovered, neither could a dietary deficiency be presumed. There was no reason to postulate a defective vitamin intake, nor any grounds for assuming a defective absorption of such vitamin content as their different diets provided. Both were given intensive oral and parenteral doses of Thiamin (vitamin B_1), 2000 units daily for three months, as well as baker's yeast; yet their recovery proceeded at the rate that clinical experience has shown to be usual for this class of case. Unfortunately estimation of the blood level of vitamin B_1 was not undertaken, but it is not possible to see how avitaminosis can be invoked in these cases, which represent a not uncommon clinical experience.

THE ACUTE FORM

In acute febrile, or acute infective, polyneuritis, after a few days of constitutional disturbance with fever but no pathognomonic features, there is a rapid development of peripheral neuritis with profound weakness of abdominal and thoracic muscles. Bilateral facial weakness is usual and may amount to almost complete facial diplegia. The muscles are tender, the tendon-jerks abolished, but sensory loss is commonly slight though conforming in character and topography to that seen in other varieties. There are usually severe tachycardia and a low blood-pressure and the patient is profoundly ill. Death may ensue from respiratory muscle paralysis, or from sudden fatal syncope. Syncope is likely to occur if the patient is not kept supine and completely at rest. Delirium may develop. In cases which survive, the paralysis tends to diminish after the first week or two, and the recovery proceeds somewhat more rapidly than in the less acute varieties. Intensive vitamin B_1 therapy—at least in my own limited experience—influences these cases not at all. Like the subacute variety this illness may appear out of the blue in previously healthy and robust subjects, whose dietary habits and general conditions of life offer no points of criticism. Here again it is at present impossible to link these cases with defective vitamin ingestion or absorption.

DIPHTHERITIC AND ALCOHOLIC AND JAKE PARALYSIS

A comparable difficulty is seen in the case of diphtheritic paralysis, which has three components: the initial local palsy, the accommodation palsy (both developing simultaneously about the second week of the illness) and the polyneuritis, the appearance of which is generally delayed for three or more weeks. The initial local palsy (palatal palsy in the ordinary case of faucial diphtheria) is determined by the site of the local diphtheritic lesion. In the outbreak of wound and cutaneous diphtheria that I reported from Palestine during the last war, this anatomical relationship between diphtheritic lesion and initial local palsy was quite clear; it may be taken to indicate a direct passage of toxins from diphtheritic lesion along neural channels to the central nervous system. The accommodation paresis, on the other hand, may appear no matter what the site of the local lesion. Both local and accommodation paralysis indicate a direct action of the toxins of diphtheria upon nerve-cells, and pathological evidence supports this. Is the commonly ensuring polyneuritis to be explained in the same way? We know that the toxins can impair the functions of nerve-cells; can they also directly give rise to the peripheral neuritis? Or is the delay in the appearance of this to be attributed to the operation of a different and perhaps an indirect process?

In alcoholic polyneuritis we approach closer to the hypothesis of a common factor. The whisky drinker who develops alcoholic neuritis generally does so very gradually, and has been aware of numbness in feet and toes, nocturnal cramps in his legs and some weakness and dyspnœa on exertion months before he seeks medical advise for increasing weakness. His alcoholic diet has no vitamin B_1 content; he generally has some degree of chronic gastritis and his damaged gastric mucosa may fail to absorb such vitamin as he manages to ingest unawares

with the nuts, chipped potatoes and hot-dogs he toys with at cocktail bars. Finally, it has been found that in this type of polyneuritis the vitamin B_1 level in the blood is below normal. Here it is reasonable to suppose that we are dealing with a process virtually the same as that obtaining in beri-beri: he is taking a diet high in calories but deficient in vitamin B_1, and this deficiency is probably made mor severe by defective absorption from the gut. The rare polyneuritis of gastric ulcer and carcinoma and of hyperemesis may be similarly produced.

"Jake" or "ginger" paralysis seen in the United States was an outbreak of severe polyneuritis due to the substitution of tri-orthocresyl phosphate for extract of ginger in a popular vari ty of soft drink. Was this a direct poisoning of nervous tissue, or was the train of processes already discussed set in motion here also?

DISCUSSION

It is always difficult to draw ætiological conclusions from therapy, for medical observations upon the results of treatment are apt to be unreliable. Yet experience has always shown that when some remedy of specific value has been found, this value is rapidly and clearly established; it is when the value of a remedy is uncertain and its action variable that conflict of opinion arises. Can we come to any conclusion as to the validity of the vitamin-deficiency hypothesis from the results of the vitamin B_1 treatment of polyneuritis? The few cases of acute febrile polyneuritis that have come my way have not been in the least degree influenced by intensive parenteral and oral administration of synthetic vitamin B_1 (thiamin hydrochloride) even with the addition of ½ oz. daily of fresh baker's yeast. I have given as much as 2000 units of B_1 daily for four weeks in chronic cases, but have yet to see any ætiological variety of polyneuritis recover more rapidly than one has been accustomed to see them do in pre-vitamin days.

I do not suggest that this indicates finally that vitamin deficiency and a resulting disorder of carbohydrate metabolism in the nerve-cell are not in question, but I do suggest that the administration of vitamin as a remedy does not lend any confirmation to the hypothesis. This is so even in acute cases where actual structural change in nerve-fibres cannot have occurred—cases in which we might reasonably expect to see some unequivocal response. In my experience no other view is yet justified, and I am not ready to mount what an American physician has called the "vitamin band waggon."

The foundation of treatment remains what it always was: complete rest in bed until the process has ceased to progress actively. Both nervous system and cardiac muscle demand this and there is no substitute for it; until the pulse-rate has fallen to normal it cannot be safe to mobilise any case of polyneuritis.

HÆMATEMESIS FROM PEPTIC ULCER

THE CASE FOR OPERATION

By H. C. Wardleworth Nuttall, F.R.C.S.
SURGEON TO THE LIVERPOOL ROYAL INFIRMARY

Early operation for hæmatemesis due to peptic ulceration has been advocated for the last twenty years, more particularly by Finsterer, Friedemann and Haberer on the Continent and by Pannett and Gordon-Taylor in this country. In spite of what appears to be overwhelming evidence in its favour, it is far from being generally accepted, most textbooks advising medical treatment or operation only after the bleeding has ceased.

One of the chief difficulties is the comparative rarity of the really severe hæmorrhages. Any individual practitioner may see only one or two in several years, but that should be no excuse for complacence in a fatal case; most of them can be saved by a timely operation. This paper is an attempt to restate the case for the surgeon and a plea, in the light of my own experience, for a bolder attitude on the part of the average surgeon with some experience of gastric surgery.

During the past eleven years I have operated on eighteen patients suffering from profuse hæmatemesis. They may be classified according to their ætiology as: chronic gastric ulcer, 9; chronic duodenal ulcer, 5; gastrostaxis, 2; carcinoma of the stomach, 1; splenic anæmia, 1. I make no excuse for the last one; it was a mistake in diagnosis; the spleen was only slightly enlarged and I did not feel it. Excluding that case and the 2 with gastrostaxis, they were all cases of severe hæmatemesis from eroded vessels. All made good recoveries except two: the case of carcinoma of the stomach and one of the cases of duodenal ulcer.

CHRONIC GASTRIC ULCER

The following four cases were treated by partial gastrectomy.

Case 1.—Woman, aged 55, with a typical ulcer history for years. Hæmatemesis at times for past four months, severe on the day before admission. At operation on Feb. 5, 1929, an hour-glass stomach was found with a large active ulcer, the size of a five-shilling piece, adherent to the pancreas and the aorta near the cœliac axis. The ulcer, which had eroded a branch of the pancreatic artery, could not be freed from the pancreas and aorta until the duodenum had been divided and the distal sac of the hour-glass resected. Part of the proximal sac was then removed and a Polya anastomosis performed with the remainder. The patient was rather collapsed but rallied after artificial respiration and blood transfusion. In view of the situation of the ulcer the after-history was significant. On the evening of the day after operation, Feb. 6, she complained of severe pain behind the right knee and down the leg. Next day the right leg and foot were cold and the foot bluish. The posterior tibial pulse was absent. By the 20th definite dry gangrene was present in the second toe and there was also a superficial patch beneath the fourth and fifth metatarsals; later the second and fifth toes had to be amputated. Apart from this she made a good recovery and was discharged on March 16. Though the actual hæmorrhage in this case was from a branch of the pancreatic artery it is evident that it was only a matter of time before the aorta itself would have been eroded.

Case 2.—Woman, aged 50. Operation on Nov. 11, 1930, for recurrent hæmatemesis. A large ulcer was present, high up on the lesser curvature, adherent to the pancreas, with considerable induration around it and erosion of a branch of the coronary artery. A partial gastrectomy was performed with Polya anastomosis. Recovery uneventful; discharged on Dec. 2.

Case 3.—Man, aged 50. Had been in a medical ward until radiography had shown a large penetrating ulcer at the middle of the lesser curvature. Owing to a severe hæmatemesis he was transferred to a surgical ward for operation on Sept 11, 1931. A chronic gastric ulcer was found high on the lesser curvature adherent to the pancreas; a fairly large artery had been eroded in the base of the ulcer—possibly a branch of the pancreatic artery. The stomach was freed from the pancreas and a partial gastrectomy performed with Polya anastomosis. Good recovery; discharged on Dec. 4.

Case 4.—Man, aged 38. History of indigestion since school days; attacks of hæmatemesis latterly, severe during last two days. At operation on May 1, 1935, thin filmy adhesions were found between stomach, gall-bladder and spleen. These were separated without difficulty and a large ulcer was found about the middle of the lesser curvature, partially adherent to the pancreas but easily freed; a branch of the coronary artery was open in the base of the ulcer. Partial gastrectomy with Polya anastomosis. Good recovery; discharged on May 17.

In the following five cases the ulcers were excised.

Case 5.—Woman, aged 46. Operation on Aug. 20, 1929. General enteroptosis. Small indurated ulcer, high up on lesser curvature, excised without clamps; small branch of coronary artery open in base of ulcer. Blood-transfusion one pint. Good recovery; discharged on Sept. 1.

Case 6.—Man, aged 51. Severe hæmatemesis and melæna for two days before admission, accompanied by sweating and collapse. At operation on July 12, 1930, a small ulcer with a base only about ⅛ in. in diameter was found just above the middle of the lesser curvature, not adherent; excised without clamps; two small vessels eroded in base. Excellent recovery; discharged on Aug. 2.

Case 7.—Man, aged 22. History of indigestion for about eleven months; epigastric pain radiating to back between shoulders, coming on about an hour after food and relieved by

food; appetite lost during attacks which lasted a week or more. Vomited blood on Aug. 19, 20 and 21 in increasing quantities. On the last occasion there were clots of blood in bright red watery fluid. Dark red blood with clots was noticed in the stools on Aug. 19 and 21. On admission on Aug. 21, 1939, his abdomen was rather scaphoid, but moved normally with respiration; liver and spleen not palpable. Pulse-rate 80; red cells 2,590,000; Hb. 55%; blood films showed no abnormality. Blood-group 4. At night he began vomiting blood again in large quantities; he became semi-delirious, and complained of great pain in the back; he was so restless that he was restrained with difficulty. Transfusion was impossible owing to his violent movements and to the complete collapse of the veins. He was taken to the theatre, open ether was administered and as soon as he was quiet I cut down on the left saphenous vein and began blood-transfusion. While this was running I made a midline epigastric incision, and found an indurated area due to an ulcer on the anterior wall of the stomach near the pylorus. When I drew it up into the wound I saw a large abnormal artery running from the trunk of the pyloric artery across the base of the ulcer and down into the fatty tissue below the pylorus (fig. 1). The artery was clamped above and below the ulcer and the latter excised with the vessel attached (fig. 2), the wound in the stomach being sutured transversely step by step as the ulcer was excised. Altogether the patient was given 2 pints of stored blood and 1 pint of saline. The artery formed an omega-shaped loop across the base of the ulcer and the orifice of the erosion measured $\frac{3}{16}$ in. He was fairly well next day and made a good recovery.

CASE 8.—Man, aged 36. Operation on Dec. 13, 1939; chronic ulcer on anterior wall of stomach found near pylorus; this was excised and pyloroplasty performed without clamps.

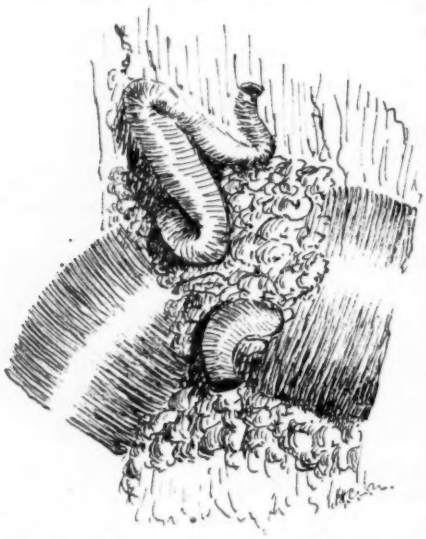


FIG. 1—Case 7. Large abnormal artery running across base of ulcer on anterior wall of stomach near pylorus. Life size.

Base of ulcer covered with recent blood clots; branch of pyloric artery eroded. Discharged on Jan. 11, 1940.

CASE 9.—Man, aged 44. Admitted on Aug. 7, 1940, for hæmatemesis. Blood-transfusion had to be stopped on account of rigors. At operation next morning a chronic ulcer was found high up on the lesser curvature; wedge excision performed without clamps. Branch of coronary artery open in base of ulcer. Some vomiting at first during convalescence but later made a good recovery and was discharged on Sept. 14.

CHRONIC DUODENAL ULCER

Three cases were treated by excision.

CASE 10.—Man, aged 22. Admitted on Jan. 22, 1932, for severe hæmatemesis. Stomach dilated. Chronic ulcer on anterior wall of duodenum, very difficult to get at; ulcer excised and fibrous mass (which later turned out to be of vegetable origin) removed from lumen of gut. Branch of gastro-duodenal artery eroded. Good recovery; discharged on Feb. 5.

CASE 11.—Woman, aged 46. Admitted on May 3, 1933, for severe hæmatemesis and melæna which had recurred in spite of medical treatment. At operation on May 5 a large ulcer was found on the anterior surface of the duodenum near the pylorus with an eroded artery in its base, possibly a branch of the gastro-duodenal artery. The ulcer was excised without clamps and she made a good recovery, being discharged on May 23.

CASE 12.—Man, aged 23. Admitted on April 18, 1940, with perforated duodenal ulcer. Operation by Mr. W. M. Beattie, the same night. Ulcer found on anterior surface of the first part of duodenum and invaginated. Discharged on May 6. Readmitted on May 22 with history of severe melæna during past twelve hours; he collapsed shortly after admission (8 P.M.) and was transfused with 3 pints of stored blood. By 1 A.M., he was still further collapsed and was having profuse hæmatemesis; melæna was still present. Another pint of stored blood given. At 10 A.M. next morning, when I saw him, hæmorrhage was obviously continuing. Immediate operation disclosed many adhesions around the pyloric end of the stomach; ulcer still active on lower and posterior wall of the second part of the duodenum and adherent to the pancreas. The adhesions were separated and on opening the duodenum at the side of the ulcer a large artery—the gastro-duodenal—could be seen and actually heard bleeding. The artery was sutured and the ulcer excised with some difficulty step by step without clamps. He received 3 pints of stored blood during the operation. For the next two days he was rather ill, but after that began to improve rapidly and was discharged on June 12.

FIG. 2—Ulcer and portion of eroded artery excised in case 7. Base of ulcer shows orifice of erosion in abnormal artery. Life size.

In the next two cases treatment was modified to suit the special conditions present.

CASE 13.—Man, aged 28. History of several mild attacks of hæmatemesis during past three years. Profuse hæmatemesis on May 21, 1939. Immediate operation; blood-transfusion, 1 pint. Chronic indurated ulcer found on posterior wall of the second part of the duodenum; anterior wall of duodenum opened and erosion of pancreatic-duodenal artery disclosed. Vessel controlled by under-running mattress suture. Duodenum closed and posterior gastro-jejunostomy performed. The patient had a little bronchitis for a few days after the operation but otherwise made a good recovery and was discharged on June 10. The anastomosis was performed in this case to give the ulcer a chance of healing.

CASE 14.—Woman, aged 51. History of duodenal ulcer since 1931 confirmed by radiography. On Nov. 11, 1939, she had a profuse hæmatemesis repeated on Nov. 12 and 13, and again on Nov. 14 when she was admitted to nursing home; she was seized by severe abdominal pain at 7.30 P.M. Perforation diagnosed. When I saw her at 9.30 P.M. she was collapsed and still in great pain, abdomen guarded but not "board like" and only moderately tender (signs obscured by morphia and shock). Slight cyanosis of face misled me as to amount of previous hæmorrhage. Operation 10.30 P.M.; peritoneal cavity full of dark bile-stained fluid; perforation $\frac{1}{4}$ in. in diameter on duodenal side of pylorus. I began excision of ulcer but found the pylorus so much thickened that I cut through the posterior wall as well. I completed the excision by resecting the pylorus altogether and rapidly performing an end-to-end anastomosis. The patient's condition after operation was better than before, but she collapsed again about 1.30 A.M. on Nov. 15 and died. This patient should have been transfused. The operation took place some miles from town, and I did not realise till later that she had lost so much blood before the perforation. It would have taken at least two or three hours to get blood during the blackout at that time of night. The double complication is almost invariably fatal. A small artery was eroded in the base of the ulcer.

GASTROSTAXIS

CASE 15.—Man, aged, 48. Typical ulcer history with periodical attacks of pain after food and hunger pain. On Christmas day, 1935, he felt sick after dinner and vomited blood; black motion passed soon afterwards. Next day he felt sick and as he was going upstairs to the lavatory he fainted and

fell on his chin sustaining a fracture of the condyle of the jaw. He was admitted the same day and kept in bed; given morphia and nothing by mouth. At 1.30 A.M. on Jan 3, 1936, sudden onset of nausea and collapse, with pallor and sweating. Laparotomy performed; blood in jejunum and colon. Stomach and duodenum apparently normal, no ulcer or induration found; stomach not opened. Blood-transfusion 1 pint during course of operation. There was one further hæmatemesis on Jan. 5 but he had remained quite free from any more attacks up to July, 1936.

CASE 16.—Woman, aged 58. Admitted on Aug. 13, 1936, for hæmatemesis; she was transfused and remained in for investigation. On Sept. 3 she vomited two bowlfuls of blood. At operation the same day I found the pylorus stenosed, but no ulcer anywhere in the stomach or duodenum. The pylorus was opened by a longitudinal incision, but careful search of the mucous surface of stomach and duodenum failed to reveal any ulcer or definite bleeding point. The wound in the pylorus was sutured transversely. Her general condition and colour improved greatly and she was discharged on Sept. 16.

CARCINOMA OF THE STOMACH

CASE 17.—Man, aged 70. Admitted in the early morning of Dec. 5, 1931, for profuse hæmatemesis. History of several attacks since Nov. 23; he "woke up on the floor" after one of them. Operation on admission. Hard saddle-shaped mass across body of stomach, size of palm of hand; no metastases seen in liver or elsewhere; right and left gastric arteries ligatured and a posterior gastro-jejunostomy performed with great difficulty without clamps. Blood-transfusion 1 pint. No further hæmatemesis but the patient gradually became weaker after the operation; bronchopneumonia developed and he died on Dec. 16.

MORTALITY

It is regarded almost as dogma that a first hæmatemesis from a peptic ulcer is never fatal, but in fact the statement is quite untrue and is based on a complete misunderstanding of the pathology of the condition. In nearly all the grave cases an eroded artery is present. In many cases the bleeding may not recur, but where there is an eroded artery it will certainly do so ("secondary hæmorrhage") within a few hours or possibly days, and if not checked will probably prove fatal. If the artery is large enough the first bleeding may actually cause death. To label recurrent hæmorrhages within a few hours or days of the first as subsequent attacks of hæmatemesis is absurd. They are all due to the same cause and must be included in the "first hæmatemesis." The mortality in these cases is undoubtedly very high indeed. Letheby Tidy (1936) says "Probably the greatest danger to life is from a first hæmorrhage . . . If the hæmorrhage is severe the possibility that an artery has been opened just as surely as if it had been cut across must be considered in all cases . . . There can be no doubt that the danger to life is from the bleeding which is taking place at the moment, not from the after result."

It has been customary for years to quote case-fatality rate of hæmatemesis from peptic ulceration as about 2·5%—that is, as a percentage of all cases of whatever degree of severity and entirely regardless of the actual pathology. Attention was first drawn to this fallacy by Bulmer (1927, 1932 and 1933) and by other writers during the past ten years, particularly Chiesman (1932), Aitken (1934), Davies and Nevin (1934). Assembling the figures of these observers—four series of cases, totalling 1411, with 219 deaths—we obtain a mortality of about 11% in all cases coming to hospital; of 25–45% in severe cases; and 52–74% when the hæmatemesis is repeated.

In view of this it is illuminating to examine the paper by Meulengracht (1939) whose regime of free diet in bleeding ulcer attracted so much attention. In discussing the effect of his treatment he says:—

"But the decisive test of the merit of the treatment is the mortality. . . . Of the 491 patients, ten died. One of these died six days after admission from perforation with diffuse peritonitis. Four arrived in a highly anæmic condition and died shortly after admission without having begun any treatment, especially no "treatment with food." The others died from recurrent arterial hæmorrhage two, six, seven, eight and seventeen days respectively after admission. A post-mortem examination revealed chronic ulcers with erosion of arteries in all the nine cases. It can well be claimed that the mortality-rate has been between 1 and 2%. A lower one can hardly be expected: there must always be a certain basic death-rate."

I fear this claim can scarcely be allowed; it is only another example of the fallacy of estimating the mortality as a percentage of the whole number of cases irrespective of their severity. This is sustained by a suggestion in a later paragraph: "It is possible that on the whole my cases are of a somewhat milder character than the hospital cases in England." Judging by other series of cases it is evident that of the 481 patients who survived there must have been a large number who would have been included in the less serious group. The fatal cases, excluding the perforation, were all examples of eroded arteries which account for most of the deaths in any series. What the figures clearly show is the complete failure of the treatment to prevent perforation in one case and death in nine others with eroded arteries.

DIAGNOSIS

The chief causes of hæmatemesis and their relative frequency are as follows: chronic peptic ulcer, acute peptic ulcer, mucosal erosion or hæmorrhagic gastritis, 90%; cirrhosis of liver and splenic anæmia, 5%; carcinoma of stomach (rarely), hæmorrhagic diseases and other causes, 5%. The practitioner may console himself with the reflection that there is no need for him to attempt an elaborate differential diagnosis. Nine times out of ten a really severe hæmorrhage will be due to ulcer, and as a rule the odd cases will give some indications of other conditions if he looks for them.

The essential thing is to make as accurate an estimation as possible by the clinical signs of the amount of blood lost, and to grade it roughly as mild, moderate or severe. The mild need not detain us, the moderate will require watching, but the severe should be regarded as a surgical em rgency. As we have seen, the really profuse hæmorrhages commonly arise from an eroded artery. Anyone who temporises with these cases is taking a serious responsibility if efficient surgical help is available. Finsterer (1939) is right in saying that it is safer to explore these cases than to wait for further hæmorrhage. It is the general practitioner who will be faced with the responsibility in the first instance and it will depend on him or her whether or not the patient gets a fighting chance for his life.

TREATMENT

A few general principles deserve mention.

Transport.—In my experience these cases take no harm from travelling many miles, if necessary. This has also been the experience of Gordon-Taylor (1937, 1939), though many of his patients were transfused en route.

Blood-transfusion.—The essential thing is to replace the blood lost, or an appreciable portion of it, immediately before or during the operation. The indication for it is based on the clinical signs of pallor, restlessness, dyspnœa and rising pulse-rate; and the amount to be given is gauged by their disappearance as transfusion proceeds. Blood-counts and hæmoglobin estimations are unreliable in these cases; they waste valuable time and may be very misleading. I do not think it matters in an emergency whether the blood is fresh or stored, or given by "flow" or "drip" methods, provided it is got into the patient with as little delay as possible in accordance with the surgeon's own technique.

Anæsthetic.—There are obvious advantages in using a method generally available in an emergency. Pannett (1928) long ago advocated open ether; any surgeon who has not a specialist anæsthetist on call or is not practised in local anæsthesia can rely on it as being reasonably safe if given with care.

Type of operation.—Many physicians have insisted that in view of the desperate condition of these patients only the minimum operative procedure should be attempted: in other words, the surgeon should be satisfied with the arrest of the hæmorrhage alone. There is everything to be said for doing as little as possible and no necessity for the average surgeon to concern himself with any procedure—such as gastrectomy—directed towards preventing further ulceration. The arrest of

the hæmorrhage, however, may itself necessitate a resection.

The simplest and quickest methods are indicated, and the use of clamps or other special apparatus is best avoided when possible. For excision of an ulcer I find the method of gradual excision with simultaneous suture of the gastric or duodenal wound very satisfactory. The actual hole in the viscus is never large, there is a corresponding diminution of bleeding from the cut edge, and in the extravasation of contents, and the actual excision

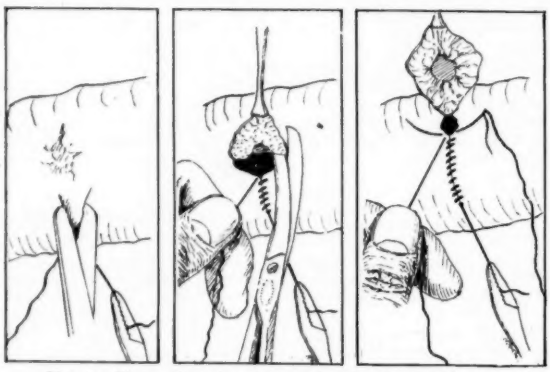


FIG. 3—Three stages in excision of a bleeding peptic ulcer.

is under the complete control of the operator from start to finish. The suture is tied on one side before the lumen is opened (fig. 3), stay sutures held by an assistant keeping the parts steady and maintaining direction. After each snip of the scissors to right and left of the ulcer the resulting orifice is sewn up and the slack of the suture held taut with the left hand whilst the next cuts are made and so on till the excision and suture are completed. I have also employed this method in a large series of perforated gastric or duodenal ulcers with very satisfactory results.

SUMMARY

Published mortality figures show that a considerable number of people do die as the result of hæmorrhage from peptic ulcer, and that an eroded vessel is usually present. Many of these deaths might be saved by operation. In a series of eighteen cases of profuse hæmatemesis operated on there were two deaths: one in a patient with carcinoma of the stomach, and the other in a patient whose ulcer perforated shortly after the hæmatemesis. Of the patients who recovered one had splenic anæmia and two were cases of gastrostaxis; the remaining thirteen were cases of ulcers with eroded vessels and would certainly have died if they had not been operated on.

Blood-transfusion and operation is the right treatment for severe hæmatemesis from a peptic ulcer. The methods used to arrest hæmorrhage should be as simple as possible, and need not aim at preventing further ulceration.

REFERENCES

Aitken, R. S. (1934) *Lancet*, **1**, 839.
— (1935) *Ibid*, **2**, 973.
Bennett, T. I. (1939) *Brit. med. J.* **2**, 463.
Bulmer, E. (1927) *Lancet*, **2**, 168.
— (1932) *Ibid*, **2**, 720.
— (1933) *Brit. med. J.* **1**, 849.
Chiesman, W. E. (1932) *Lancet*, **2**, 722.
Davies, T. A. and Nevin, R. W. (1934) *Brit. med. J.* **2**, 858.
Finsterer, H. (1939) *Surg. Gynec. Obstet.* **69**, 291.
Gordon-Taylor, G. (1935) *Lancet*, **2**, 811.
— (1937) *Brit. J. Surg.* **25**, 403.
— (1939) *Med. Pr.*, **202**, 5241.
Graham, J. G., Alexander, J. C. and Kerr, J. D. O. (1939) *Lancet*, **2**, 727.
Hurst, A. F. (1936) *Guy's Hosp. Rep.* **86**, 135.
Jones, F. A. (1939) *Brit. med. J.* **1**, 915.
Meulengracht, E. (1939) *Ibid*, **2**, 321.
Pannett, C. A. (1928) *Ibid*, 623.
Rivers, A. B. (1935) in Eusterman and Balfour's The Stomach and Duodenum, London, p. 751.
R. Soc. Med. discussion (1931) *Brit. med. J.* **1**, 847.
— (1934) *Lancet*, **1**, 572.
Ryle, J. A. (1937) *Lancet*, **1**, 1.
Short, A. R. (1931) *Brit. med. J.* **1**, 435.
Tidy, H. L. (1935) *Lancet*, **2**, 915.
— (1936) *Brit. med. J.* **1**, 1146.
— (1937) *Med. Annu.* p. 167.
Walton, A. J. (1930) The Surgical Dyspepsias, London, pp. 99 and 401.
Wilkie, D. P. D. (1933) *Brit. med. J.* **1**, 774.
Witts, L. J. (1937) *Ibid*, 847.

TOXIC EFFECTS OF IROKO

AN AFRICAN WOOD

BY J. M. DAVIDSON, M.D. Edin., D.P.H.
H.M. MEDICAL INSPECTOR OF FACTORIES

SINGLE cases of allergic dermatitis due to idiosyncrasy to wood dust are not uncommon, and varying degrees of constitutional disturbance have been described. A considerable variety of woods, mostly dense hardwoods of tropical or subtropical origin such as satin woods, teak and mahogany, are capable of acting as allergens in susceptible persons, but in the fairly extensive literature on poisonous woods there appears to be only one reference to iroko, which was the wood responsible for the following outbreak.

In a large modern wood-working shop in which nearly a hundred men are employed well-seasoned iroko imported in the form of planks has been handled intermittently for some years without ill effect. Recently, however, a supply of this timber was purchased in the form of logs which necessitated sawing in this country, and it was this consignment which gave rise to the outbreak to be described. The dust from this timber was moister than that usually associated with more seasoned wood, and tended therefore to adhere more readily to the skin. Of more than fifty men who were engaged in manipulating this wood in the machine shop nearly all complained of irritation of exposed skin surfaces. Nine complained of more severe symptoms (some within an hour or two of first contact with iroko), necessitating in the case of three of them complete absence from work for some weeks and in the others cessation of contact with iroko.

The symptoms in these nine cases were more or less alike, but varied in intensity and duration in different individuals. All complained of itching of exposed skin surfaces while some suffered also from intense irritation of covered parts, especially the neck, axillæ, antecubital fossæ, genitalia and backs of the knees. In some cases there was marked œdema of the face with ocular irritation and blepharospasm. A few complained of symptoms of acute coryza, with headache and mild pharyngitis, while others complained of chest symptoms—a sense of constriction, retrosternal oppression, dry cough, and dyspnœa simulating asthma. One man complained of acute depression attributed to the widespread nature of his symptoms and consequent loss of sleep. In all these cases the symptoms subsided only very slowly, taking four or five weeks to disappear, and reappearing in milder form in two men who were unwittingly exposed to further contact. In most cases exposed skin surfaces showed a fine powdery desquamation after some weeks, while affected covered parts tended to show some residual thickening and œdema. The affected men were all experienced woodworkers with nothing of note in their previous histories except that two of them had had earlier attacks of dermatitis attributed to teak and had remained sensitive to that wood.

Preventive measures suggested to limit the incidence of such cases in the future included careful attention to dust extraction, the supplying of light-weight respirators, wearing of suitable protective clothing, close-fitting at neck and wrists, and the provision of good washing facilities.

Iroko is a vernacular name and also the British Standard trade name for the wood of *Chlorophora excelsa* Benth. and Hook. f., a tree of East and West Tropical Africa. It has been marketed as African teak or iroko teak, but this designation is incorrect and misleading since the timber is not botanically related to true teak (*Tectona grandis*). Other vernacular names which are used in commerce and may be met with in technical literature are mvule, odum and kambala. Iroko is one of the most widely used utility timbers in Africa and considerable quantities have been exported in recent years to Europe where it is used as a substitute for teak. The timber is resistant to decay and presumably contains some principle, probably an essential oil, which is toxic to micro-organisms. A French investigator (Marmasse 1931) has found the acetone solubility to be 4·46%, and he describes the extractive as being of a resinous nature, soluble in alcohol, slightly soluble in ether and insoluble in water and benzene.

The sole reference to iroko in the literature on poisonous woods seems to be that by Wagner (1938), who mentions it as one of a number of woods which cause skin irritation, but in " Occupation and Health," published by the International Labour Office (pamphlet No. 22, " Poisonous Woods "), there is mention of cases of dermatitis attributed to East African " moule " wood which may have been iroko.

I am indebted to the director of the Forest Products Research Laboratory for the technical particulars of iroko, and for confirming the botanical identity of the timber responsible for the illnesses.

REFERENCES

Marmasse, P. (1931) Contribution à l'étude analytique de quelques bois coloniaux, Paris.
Wagner, E. (1938) *Holzmarkt, Berl.* **55**, 300.

A CASE OF EXOPHTHALMIC OPHTHALMOPLEGIA

BY LAURENCE MARTIN, M.D. Camb., M.R.C.P.
LEVERHULME SCHOLAR OF THE ROYAL COLLEGE OF PHYSICIANS, AT THE DEPARTMENT OF MEDICINE, CAMBRIDGE UNIVERSITY; AND

VERNON PENNELL, M.B. Camb., F.R.C.S.
SURGEON TO ADDENBROOKE'S HOSPITAL, CAMBRIDGE

THE syndrome of exophthalmic ophthalmoplegia was fully described by Russell Brain and Turnbull (1938), who differentiated it from exophthalmic goitre. The purpose of this paper is to describe a case with moderate thyrotoxicosis and ophthalmoplegia with diplopia, but only slight exophthalmos.

CASE-RECORD

A man, aged 52, manager of a college kitchen, was admitted to the private wards of Addenbrooke's Hospital on Dec. 29, 1939, complaining of double vision and loss of weight. He was well until February, 1939, when he noticed swelling of his eyelids, but no visual disturbance; an error of refraction was corrected and the swelling was said to subside. From July onwards his friends noticed his eyes to be staring. In August he was called up in the naval reserve and found at the medical examination that he weighed only 12 st. 2 lb. instead of his usual 12 st. 7 lb. In September he first noticed double vision on looking upwards, which persisted thereafter. His appetite had become voracious although he was still losing weight, he had palpitations on exertion and his limbs felt weak if he walked uphill or ran. He was not nervous, but had become unusually "fidgety" about his work, although he denied being worried by the threat or actual outbreak of war. He was married, with one child, and had no domestic or financial worries.

A B

Photograph taken in May, 1940. A, shows exophthalmos in right eye, with much retraction of upper lids in both eyes, especially the left. Note that no sclera is visible below the cornea in either eye, but that it is exposed above the cornea because of the lid retraction. B, shows maximum upward movement of the eyes, deficient in the right.

On admission his weight was 10 st. 3 lb. He lay quietly in bed and was not obviously nervous. Speech normal, skin not noticeably warm or moist. No tremor of hands. Pulse-rate 75 per minute, regular. Apex-beat 4 in. from midline in 5th left space, quiet and localised, sounds normal. B.P. 130/70. Heart radiologically normal. Chest and abdomen normal. Thyroid not visible and barely palpable, but felt smooth and symmetrical. Radiography of neck showed no tracheal compression or retrosternal prolongation of the thyroid. Pupils normal in shape, size and reactions. Eyelids slightly puffy, but did not pit on pressure. Exophthalmos appeared to be slight, but greater in right eye. No sclera visible below cornea in either eye. Considerable lid retraction in both eyes, more so in left, with exposure of sclera above cornea. Forehead barely wrinkled on looking up. Both lids lagged on looking down and left palpebral fissure was wider than right. Blinking normal in frequency. Upward movement of the eyes deficient and accompanied by pain in right eye, with diplopia above horizontal. Some paresis of both external recti, more marked in right eye, with diplopia on maximum movement to both sides. No abnormal signs in central nervous system.

Progress.—The patient received Lugol's iodine, and seven days after admission one of us (V. P.) performed a subtotal thyroidectomy under Avertin with gas and oxygen. The thyroid weighed 20 g. and was smooth and symmetrical. Histological examination showed diffuse epithelial hyperplasia with poorly staining vacuolated colloid, and areas of lymphocytic infiltration. The patient's postoperative course was uneventful, and on his discharge twelve days after operation he felt much better and had gained 3½ lb., to 10 st. 6½ lb. The ophthalmoplegia and other eye signs were unaltered. In May, 1940, four months after operation, he weighed 12 st. 10 lb. The eye signs were unchanged. In August, 1940, eight months after operation, he weighed 13 st. He felt well and strong, but was worrying about the war.

Exophthalmometer readings were then obtained as follows with Pochin's (1939) modification of Hertel's instrument: right eye 18 mm.; left eye 13 mm. Brain (1938) gave 12·5 mm. as an average normal reading, but Pochin (1940) put the figure at 15 mm. with his particular instrument. Without a large series of normal readings, and with an instrument by which each observer must make his own observations of the normal, one can only say that the exophthalmos in the present case was slight; furthermore, there was no exposure of sclera below the cornea, which Pochin (1938) described in exophthalmos (see figure). It is a pity that the exophthalmometer was not available for repeated observations on this patient, but clinical and photographic records showed no appreciable change during the period January–August, 1940.

DISCUSSION

McGregor (1940) has reported a case of exophthalmic ophthalmoplegia in which the ophthalmoplegia existed for some time before severe exophthalmos developed; this came on during the month after thyroidectomy and thereafter remained unchanged for eight months. McGregor therefore questioned Brain's view that the ophthalmoplegia was largely dependent on exophthalmos, and that the more rapidly the exophthalmos developed the more likely was the ophthalmoplegia to occur. The case described here adds further weight to McGregor's doubts, for exophthalmos had never been more than slight and was not increased by thyroidectomy, yet ophthalmoplegia and diplopia were early symptoms. The patient was warned that thyroidectomy would probably not improve his diplopia, and such proved to be the case.

In view of the distinctive factors, such as higher incidence among men of middle age, the small part played by thyrotoxicosis, and occurrence after thyroidectomy, it seems justifiable to maintain the differentiation between exophthalmic ophthalmoplegia and exophthalmic goitre. One cannot, however, neglect the fact that exophthalmic ophthalmoplegia is always associated with past or present thyrotoxicosis, and it was a striking fact that McGregor's patient had two sisters with Graves's disease and two others with large symptomless goitres. The occurrence of Möbius's sign (difficulty in convergence of the eyes) in true exophthalmic goitre suggests that there may be a closer link with exophthalmic ophthalmoplegia than is at present evident.

SUMMARY

A case of exophthalmic ophthalmoplegia is described in which ophthalmoplegia with diplopia was an early symptom, but exophthalmos was slight. This further questions the dependence of ophthalmoplegia on exophthalmos.

The occurrence of Möbius's sign in true exophthalmic goitre is a possible link with exophthalmic ophthalmoplegia.

Our thanks are due to Dr. Russell Brain and Dr. E. E. Pochin for personal communications, and to Messrs. Theodore Hamblin Ltd. for loan of the exophthalmometer.

REFERENCES

Brain, W. R. and Turnbull, H. M. (1938) *Quart. J. Med.* **7**, 293.
McGregor, H. G. (1940) *Lancet*, **2**, 579.
Pochin, E. E. (1938) *Clin. Sci.* **3**, 197.
— (1939) *Ibid*, **4**, 79.
— (1940) Personal communication.

EFFECTS OF ŒSTROGENS ON LACTATION

BY S. J. FOLLEY, D.Sc., Ph.D. Manc.

PHYSIOLOGIST IN CHARGE OF THE SECTION OF LACTATIONAL PHYSIOLOGY, NATIONAL INSTITUTE FOR RESEARCH IN DAIRYING, UNIVERSITY OF READING

IT is now an accepted fact that the administration of œstrogen stimulates growth of the mammary ducts, and in some species the lobule-alveolar system, though it is not yet clear whether the effect is direct (Lyons and Sako 1940) or whether œstrogen causes the anterior pituitary to produce "mammogenic" hormones (Lewis and Turner 1939). It has further been known for some time that œstrogens will inhibit lactation. This has been shown for the mouse by Parkes and Bellerby (1926–7), Robson (1935) and de Jongh (1933), the rat by Folley and Kon (1937) and the cow by Folley (1936) and Waterman, Freud and Vos-de-Jongh (1936). Clinical application of this finding for terminating lactation in women is now common (see Foss and Phillips 1938, Ramos and Colombo 1938, and Kellar and Sutherland 1939). Œstrogens inhibit lactation whether or not the ovary is present (Robson 1935), though in its absence a higher dose is required than in the intact animal (Folley and Kon 1937). Nelson (1936), on the basis of evidence largely obtained with the guineapig, has put forward the theory that œstrogen is the agent responsible for preventing lactation during pregnancy, but Turner (1939) doubts this and points out that the doses necessary experimentally to suppress lactation are much larger than are likely to be present in the body during the latter half of pregnancy.

At least one androgen, testosterone, possesses the power of inhibiting lactation, though *cis*-androsterone does not (Robson 1937, Folley and Kon 1938). Indeed, testosterone has recently been used clinically for the suppression of lactation (e.g. Portes, Dalsace and Wallich 1939, Beilly and Solomon 1940). It seems more than a coincidence that testosterone also stimulates mammary growth (Selye, McEuen and Collip 1936, Astwood, Geschickter and Rausch 1937, Bottomley and Folley 1938) while *cis*-androsterone has hitherto proved inactive in this respect, at any rate in the rat (Nelson and Gallagher 1936), guineapig (Bottomley and Folley 1938) and monkey (van Wagenen and Folley 1939), and practically so in the mouse (Van Heuverswyn, Folley and Gardner 1939). Folley and Kon (1937) were therefore led to suggest that the power of inhibiting lactation is also characteristic of substances which stimulate mammary growth.

A second action of œstrogens on lactation was described by Folley (1936) who found that, under suitable conditions, administration of moderate doses of œstrogen to lactating cows resulted in prolonged and significant increases in the percentages of fat and non-fatty solids in the milk, while the inhibition effect was only partial and temporary. This second effect, which has since been called the "enrichment effect," has been further studied with the relatively cheap synthetic œstrogen, diethylstilbœstrol, in order to investigate the possibility of applying it practically for raising the content of non-fatty solids in the milk of cows whose milk contains less than the legal minimum (8·5%) (Folley and Scott Watson 1938, Folley, Scott Watson and Bottomley 1941). These experiments led to the conclusions (1) that the threshold for the enrichment effect is lower than that necessary for inhibition, (2) that the enrichment effect represents a true stimulation of lactation in the sense of an increase in the rate of secretion of milk solids by the mammary gland and not merely a concentration of the milk due to the secretion of less water, and (3) that the enrichment and inhibition effects are difficult to separate when diethylstilbœstrol is used, though they appear (Folley 1936) to be readily separable if one uses œstrogens from natural sources; this may be because diethylstilbœstrol is less rapidly destroyed in the organism after absorption from the site of injection than natural œstrogens (Stroud 1939, Zondek and Sulman 1939). This work has incidentally demonstrated that under certain conditions œstrogen can "dry off" a lactating cow, the possibility of which was apparently doubted by Turner (1939).

Recent work (see Turner 1939, and Folley 1940) has emphasised the central and prepotent rôle in lactation occupied by the anterior pituitary, and it seems likely that both effects on lactation exerted by œstrogens—the enrichment and the inhibition effects—are mediated by the anterior pituitary. Dosage seems to be an important factor in determining which effect is elicited. Small doses of œstrogen appear to activate the anterior pituitary in respect of the production of those hormones—and there is evidence that others besides prolactin are concerned (see Folley and Young 1938, 1939)—which govern lactation, while larger doses suppress the production of these hormones. In this connexion, evidence that the secretion of gonadotrophic hormones by the anterior lobe is similarly promoted and suppressed by large and small doses of œstrogen respectively is discussed by Severinghaus (1939).

This conception renders intelligible certain other results which were difficult to explain on the assumption that œstrogens exerted solely an inhibitory action on milk secretion. As long ago as 1935, Frazier and Mu observed that lactation could be induced in male rabbits by œstrogen administration. More recently, Folley, Scott Watson and Bottomley (1940) found that virgin goats can be caused to secrete considerable quantities of milk of normal, and indeed excellent, composition, by inunction of the udder with small amounts of diethylstilbœstrol. Contrary to the findings of de Fremery (1938) it was not necessary to administer anterior-pituitary extracts in addition. An important point to be noted about these experiments was the fact that lactation began and increased in intensity while œstrogen administration continued. The interpretation of these results now seems clear. Evidently the administration of œstrogen has, first, caused udder development, and secondly, evoked the production by the anterior pituitary of hormones stimulating lactation.

Finally, returning to the suggestion that the power to inhibit lactation is characteristic of those substances which stimulate mammary growth, the finding of Gardner, Smith, Allen and Strong (1936), that high doses of œstrogens cause inhibition rather than stimulation of mammary development, has been confirmed (Van Heuverswyn, Folley and Gardner 1939). The original suggestion should therefore be modified thus: there are certain substances, most important of which are the œstrogens, which stimulate mammary growth and lactation when administered in small doses and inhibit both in large doses.

SUMMARY

Besides their well-known inhibitory action on lactation, œstrogens are capable, under suitable conditions, of a galactopoietic effect which chiefly manifests itself as an increase in the concentration of both fatty and non-fatty solids in the milk (enrichment effect).

The threshold for the enrichment effect is lower than for inhibition; in general, small doses cause enrichment while large doses also elicit inhibition. The two effects seem to be more readily separable with natural œstrogens than with diethylstilbœstrol.

The induction of copious and prolonged lactation in virgin goats by inunction of the udder with œstrogenic ointment is explicable in the light of this conception.

It is concluded that œstrogenic hormones and certain other substances possess the power of stimulating not only mammary development but also lactation when administered in small doses, and of inhibiting both in large doses.

The investigations at the National Institute for Research in Dairying have been supported by grants from the Milk Marketing Board. Diethylstilbœstrol was generously provided by Dr. F. L. Pyman, F.R.S., of Boots Pure Drug Co., Ltd., Nottingham.

REFERENCES

Astwood, E. B., Geschickter, C. F. and Rausch, E. O. (1937) *Anat. Rec.* **61**, 373.
Beilly, J. S. and Solomon, S. (1940) *Endocrinology*, **26**, 236.
Bottomley, A. C. and Folley, S. J. (1938) *Proc. roy. Soc.* B. **126**, 224.
Folley, S. J. (1936) *Biochem. J.* **30**, 2262.
— (1940) *Biol. Rev.* **15**, 421.
— and Kon, S. K. (1938) *Proc. roy. Soc.* B. **124**, 476.
— and Scott Watson, H. M. (1938) *Lancet*, **235**, 423.
— — and Bottomley, A. C. (1940) *J. Physiol.* **98**, 15 P.
— — — (1941) *J. Dairy Res.* (in the press).
— and Young, F. G. (1938) *Proc. roy. Soc.* B. **126**, 45.
— — (1939) *Biochem. J.* **33**, 192.
Foss, G. L. and Phillips, P. (1938) *Brit. med. J.* **2**, 887.
Frazier, C. N., Mu, J. W. (1935) *Proc. Soc. exp. Biol., N.Y.* **32**, 997.
de Fremery, P. (1938) *Arch. néerl. Zool.* **3**, suppl. 48.
de Jongh, S. E. (1933) *Acta brev. neerl. Physiol.* **3**, 52.
Kellar, R. J. and Sutherland, J. K. (1939) *J. Obstet. Gynæc.* **46**, 1.
Lewis, A. A. and Turner, C. W. (1939) *Res. Bull. Mo. agric. Exp. Sta.* No. 310.
Lyons, W. R. and Sako, Y. (1940) *Proc. Soc. exp. Biol, N.Y.* **44**, 398.
Nelson, W. O. (1936) *Physiol. Rev.* **16**, 488.
— and Gallagher, T. F. (1936) *Science*, **84**, 230.
Parkes, A. S. and Bellerby, C. W. (1926–27) *J. Physiol.* **62**, 301.
Portes, L., Dalsace, J. and Wallich, R. (1939) *C. R. soc. Biol. Paris*, **130**, 1100.
Ramos, A. P. and Colombo, E. (1938) *Disch. med. Wschr.* **64**, 782.
Robson, J. M. (1935) *Quart. J. exp. Physiol.* **24**, 337.
— (1937) *Proc. Soc. exp. Biol., N.Y.* **36**, 153.
Selye, H., McEuen, C. S. and Collip, J. B. (1936) *Proc. Soc. exp. Biol., N.Y.* **34**, 201.
Severinghaus, A. E. (1939) Allen's Sex and Internal Secretions, London, chap. 19.
Stroud, S. W. (1939) *J. Endrocrinol.* **1**, 201.
Turner, C. W. (1939) Allen's Sex and Internal Secretions, London, chap. 11.
Van Heuverswyn, J., Folley, S. J. and Gardner, W. U. (1939) *Proc. Soc. exp. Biol., N.Y.* **41**, 389.
van Wagenen, G. and Folley, S. J. (1939) *J. Endocrinol.* **1**, 367.
Waterman, L., Freud, J. and Vos-de-Jongh, N. (1936) *Acta brev. neerl. Physiol.* **6**, 84.
Zondek, B. and Sulman, F. (1939) *Nature, Lond.* **144**, 596.

SUPRAVITAL STAINING
IN DIAGNOSIS OF MONOCYTIC LEUKÆMIA

BY RONALD MACKEITH, D.M. Oxfd
RESIDENT MEDICAL OFFICER AT ST. JAMES' HOSPITAL, L.C.C.; AND
URSULA M. BAILEY, B.Sc. Lond.

MONOCYTIC leukæmia is now accepted as a definite entity. The clinical picture has been described (Osgood 1937, Vaughan 1938, Whitby and Britton 1939), but it is not always distinct from other acute leukæmias, nor is examination of fixed blood-films always diagnostic. The predominant cells are primitive and often difficult to differentiate, there are usually few normal mature monocytes, and the frequent presence of immature cells of the myeloid series may cause confusion with myeloid leukæmia.

In the differentiation of white blood-cells the peroxidase stain has been widely used, but it does not distinguish between the most primitive cells of the different series. Supravital staining, on the other hand, often shows marked differences between these cells (Cunningham, Sabin and Doan 1925). Whitby and Britton (1939) point out that its value in differentiating acute leukæmias of the "blastic" type is undoubted, the minute and subtle differences between various cells stained with Romanowsky stains being strikingly distinct with a supravital preparation.

The technique of supravital staining to be described is a simplification of that used by Lightwood, Hawksley and Bailey (1935). Slides and coverslips must be absolutely free from grease. Coverslips are kept for four days in concentrated sulphuric acid containing a few crystals of potassium bichromate, washed for three hours in running hot water and rinsed several times in distilled water, in which they are left over-night. A quicker way is described by Panton and Marrack (1939). Slides may be cleaned in one of these ways or more simply by washing thoroughly in soap and hot water, wiping dry, flooding several times with xylol and wiping dry again. After cleaning, the coverslips and slides are stored in methylated spirit, and when wanted are picked out with cleaned forceps, wiped and flamed. The clean slides are "surfaced" with a mixture of neutral red and janus green. The following stock solutions of the stains appear to keep indefinitely: 0·25% Gurr's neutral red (chloride); and 0·4% Gurr's vital janus green B separately in re-distilled absolute ethyl alcohol. For staining the slides 1·75 c.cm. of the stock neutral red and 0·07 c.cm. of the stock janus green are added to 10 c.cm. of re-distilled absolute alcohol. Each cleaned slide is dipped separately into the neutral-red janus-green solution and then allowed to stand in a vertical position till evaporation is complete. These "surfaced" slides keep well and are always available for doing the test.

For the test, blood from a freely flowing prick in the ear is taken on a cleaned coverslip, which is then placed blood-side down on a "surfaced" slide and sealed round with Vaseline. The preparation is placed in an incubator at 37° C. for 15–30 minutes and then examined on the ordinary microscopic stage. We find that after this incubation the cells have usually taken up enough stain for the different types to be identified. The motility of the monocytes and neutrophils, though diminished, is sufficient to be of help in identifying cells, and is not abolished even after the preparation has been on an unheated microscope stage for periods up to an hour. If the amount of stain taken up by the cells is inadequate or if the motility becomes very slight, the slides may be returned to the incubator for further periods. Using this technique, a hot box or warm stage is not essential.

BLOOD-COUNTS IN CASE I

—	March 19		March 25		March 30		April 2	
Red cells (per c.mm.)	..		1,070,000		1,100,000		..	
Hb (Haldane), %	31		24		21		24	
Colour-index	..		1·2		0·95		..	
Reticulocytes (per 100 red cells)	2·4		2·4		..		..	
White cells per c.mm.	205,000		125,000		149,000		169,000	
Differential white-count (%):	Fixed	s.-v.	Fixed	s.-v.	Fixed	s.-v.	Fixed	s.-v.
Myeloblasts	0·5	..	..	..	..	..	0·5	..
Myelocytes	0·5	5·0	2	6·5	2	5·5	8·0	13
Metamyelocytes—neutrophil	2·5	1·5	2	1	3	1·5	3·0	..
eosinophil	0·5	0·5	..	..	..	..	1	4
Polymorphs—neutrophil	7	3·5	9	4·5	4	3·5	7·0	4
eosinophil	3	0·5	..	1·5	..	1	..	..
basophil	..	..	..	..	..	..	..	..
Lymphocytes—small	6·5	4·5	4	3	3	4	6·5	1
large	..	2	3	3	0·5	2	0·5	10
Monoblasts	2	0·5	1	..	..	2·5	2	..
Atypical cells of monocytic series	74·5	82	77	79	86	80	70·5	68
Normal monocytes	..	..	..	..	..	..	..	..
Monocytes with segmented nucleus	3	..	2	1·5	1·5	..	1	..
Normoblasts (per 100 white cells)	..	1	..	..	..	..	..	..

CASE-RECORDS

CASE 1.—A woman, aged 81, had had stomach trouble for years and suffered from constipation with intermittent diarrhœa, but had a good appetite, ate a varied diet, and was able to live alone. She had seven children "all subject to anæmia," but the three seen appeared healthy. At the beginning of January, 1937, she had a recurrence of the diarrhœa with vomiting, which increased till she was bringing up even water. The vomiting was immediately relieved by hydrochloric acid and her anæmia was improved with iron for some time, but she later became easily fatigued. About this time she noticed soreness after wearing her dentures, and in the middle of February she developed œdema of the left leg. On March 9, 1937, she was admitted to hospital.

Her general condition was fair, but she was thin, languid and very pale. Tongue smooth, buccal mucosa pale but otherwise normal. Pulse-rate 80, regular and soft. Heart normal. Râles at bases of lungs. Liver three finger-breadths below costal margin with sharp flexible edge, smooth and moderately tender. Spleen not palpable. No enlargement of lymph-glands. Left foot and ankle showed considerable pitting œdema; right, a slight amount. Blood-

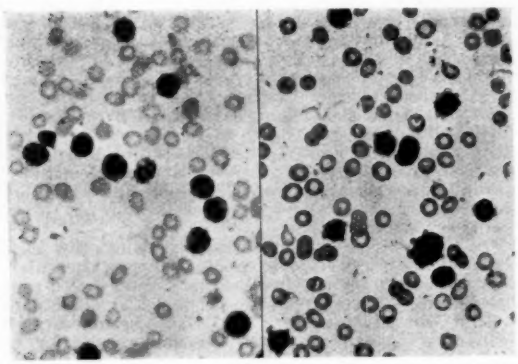


FIG. 1—Case 1; sixteenth day after admission. Leishman stain (× 800). This is a typical field for this case. All but one of the white cells seen are primitive monocytes, some showing indentation (? infolding) of the nucleus.

FIG. 2—Case 1; thirteenth day after admission. Leishman stain (× 800). Field selected to show pseudopodia. They were not usually well-marked in this case.

count on March 10: red cells 1,600,000; Hb 33% Haldane; white cells 184,000, chiefly mononuclear cells, probably monocytes (U. M. B.).

She complained of poor appetite but ate fairly well. She remained afebrile throughout (except for a spike of fever to 99·4° F. after sternal puncture), with pulse-rate 70–80. On March 19 she developed two lentil-sized superficial ulcers of the buccal mucosa, which persisted unchanged. The spleen and lymph-glands were at no time clinically enlarged. Treatment included massive iron dosage and intramuscular liver extract.

Investigations gave the following results. Urine: albumen +, a few white and red cells. Blood: Wassermann and Kahn reactions and gonococcal complement-deviation test all negative; van den Bergh direct test negative, indirect test normal; icterus index (Meulengracht) 4; blood-urea 114 mg. per 100 c.cm. Radiography of skull, long bones, hands and pelvis on March 20 showed nothing abnormal. On March 22 fundi very pale; three flame-shaped hæmorrhages in left, one in right fundus. The results of some of the blood-counts are given in table I. On April 4 (twenty-five days after admission) she became suddenly worse and died after twelve hours in coma.

Autopsy (Dr. A. B. Bratton) confirmed the diagnosis of monocytic leukæmia. Pale marrow in sternum and vertebræ a little pink, mainly in the fatty marrow of the femur. No enlargement of the lymphatic glands. Small, firm, slightly rusty spleen. No other significant findings. On microscopical examination, slight excess of fat in the active marrow of a lumbar vertebra; the predominant feature was the formation of monocytes, but cells of the granular series were almost as numerous; erythropoiesis was inconspicuous. The changes in the sternum were similar, but there was a greater degree of erythropoiesis. The marrow of the femur was fatty; there were numerous minute foci of monocytic formation and a smaller number showing leucopoiesis; erythropoiesis was almost absent. Slight leukæmic reaction in cœliac and cervical lymphatic glands, in which the monocytic and granular series were equally represented by mature and immature forms. A similar reaction in the spleen; also numerous phagocytes filled with granules of iron-containing pigment.

On first examination of the Leishman films of this case it appeared to us probable that the majority of the cells were monocytic (figs. 1 and 2), and supravital staining confirmed this opinion since the cells showed the following properties:—

1. They were actively phagocytic; the neutral red being taken up into vacuoles, later arranged in the hof of the nucleus.
2. Mitochondria staining a greenish-blue were usually present.
3. The nucleus was eccentric and sometimes indented.
4. They were definitely motile; though, owing to the simplified technique, motility was sluggish. In moving, the cytoplasm preceded the nucleus in the direction of progress (fig. 2).

Besides the monocytic cells with these properties, myeloid and lymphatic series cells could be recognised. Differential counts were made and are given in the table in parallel with those done on Leishman preparations. The agreement is satisfactory. In examining the Leishman films we saw only one normal monocyte in counting over 2000 cells. A few definite monoblasts were identified, but most of the white cells were atypical primitive monocytes, apparently of various stages of development.

CASE 2.—A man, aged 57, a painter, without noteworthy previous or family history, at the beginning of September, 1938, developed flatulence and epigastric pain after meals, and noticed he was getting pale; a week later he developed a rash on his arms. On Sept. 12 he was admitted to hospital. He was ill, pale and rather wasted. Tongue furred, teeth very dirty, gums infected. No lesions of buccal mucosa. Temperature 101° F., pulse-rate 100, regular. Heart not enlarged, apical systolic murmur. Papular rash in flexures of elbows. Abdomen tender generally but not rigid. Liver enlarged to umbilicus. Spleen not palpable. No lymphatic glandular enlargement. Blood-count on Sept. 14: red cells 2,920,000; Hb 50%; megaloblasts 2 per 100 white cells; white cells 43,400 (polymorphs 1%, eosinophils 0·5%, myeloblasts and myelocytes 98·5%). On Sept. 19 a peroxidase reaction confirmed that most of the cells were myeloblasts. A diagnosis of acute myeloid leukæmia was made. During his stay in hospital he ran an irregular fever and became steadily weaker. On Sept. 22 the left arm became œdematous from venous thrombosis.

We saw him on Sept. 27. With supravital staining 90% of the white cells were found to be monocytic, and showed the characters described under case 1, except that the nuclei were oval or only rarely indented. Total white-cell count 17,500; differential count done on the supravital preparation: polymorphs 1%, metamyelocytes 0·5%, myelocytes 1·5%, lymphocytes 6·5%, monocytes 90%, monoblasts 0·5%. He died on Sept. 29.

At *autopsy* (Dr. A. P. Piggot) the liver was enlarged with some network infiltration. Spleen enlarged to about twice normal size, firm and pale on section. Lymph-glands not enlarged. Bone-marrow of femur pinkish grey. Microscopically (Dr. T. N. Gledhill) the spleen and liver showed the typical leukæmia picture, and there was infiltration of the kidney by immature white cells, more particularly at the junction of the cortex and medulla. From the sections it was impossible to say more than that the cells were blast cells. The bone-marrow was completely fatty. The myocardium showed fatty change but no leukæmic infiltration. The lungs showed infarction, and thrombi were seen in several of the larger blood-vessels in the section. The axillary vein showed antemortem thrombus.

CASE 3.—A woman, aged 51, in December, 1938, had a superficial phlebitis of the left leg and later developed shortness of breath, a slight cough and a poor appetite, and complained of drumming in the right ear. At the end of December she took to her bed and on Jan. 11, 1939, was admitted to hospital.

She was very pale. Temperature 101° F., pulse-rate 138, respiration-rate 36. Tongue sore but no visible abnormality.

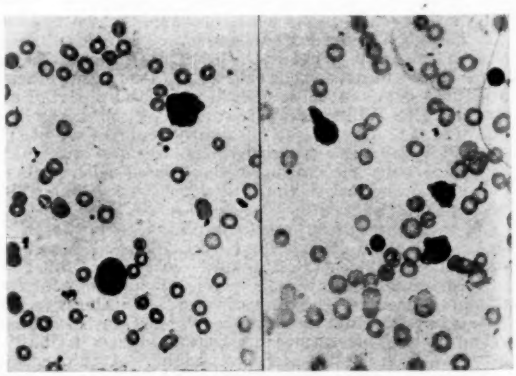


FIG. 3—Case 3. Leishman stain (× 800). The field contains two primitive monocytes, typical of the majority seen in this case; one shows shallow pseudopodia, the other shows an indented nucleus.

FIG. 4—Case 3. Leishman stain (× 800). Three monocytes are seen, showing the characteristic pseudopodia.

Soft palate showed several small grey ulcers with a red margin. Heart regular, slightly enlarged, tricuspid systolic murmur. Blood-pressure 165/90. Spleen palpable just below costal margin. Liver and lymph-glands not enlarged. Small area of tenderness and induration at site of old varicose ulcer on left leg. Blood-count on Jan. 13: red cells 1,550,000; a few megaloblasts seen; Hb 36%; colour-index 1·2; white cells 43,600 (polymorphs 7%, lymphocytes 4%, blast cells 89%). A provisional diagnosis of acute myeloid leukæmia was made. She continued to have some irregular fever, but for a time appeared to improve. The spleen was at times impalpable and never extended to more than a finger's-breadth below the costal margin; the liver became enlarged to two finger-breadths below the costal margin. There was never any lymph-gland enlargement.

We saw her on Jan. 21. The clinical picture and appearance of the cells in the Leishman film suggested that the diagnosis was probably monocytic leukæmia. Blood-count: red cells 1,500,000; Hb 29%; white cells 52,500 (polymorphs 4%, myelocytes 1%, lymphocytes 19%, monoblasts 0·5%, atypical primitive monocytes 58·5%, atypical monocytes with lobed nucleus 15%, normal monocytes 2%; total monocytic series cells 76%. In counting 200 white cells one pro-erythroblast was seen). A supravital preparation showed that most of the white cells were monocytic series cells (figs. 3 and 4), the differential count on 200 white cells giving: myeloid cells 7%, lymphocytes 12%, monocytic cells 81%. The diagnosis of monocytic leukæmia was thus established.

Two weeks after admission she began to get rapidly worse, with headache, deafness in the right ear and coryza. There were no lesions of the buccal mucosa at this stage. She died on Jan. 31.

At *autopsy* (Dr. A. P. Piggot) the liver was found to be enlarged, with well-marked white network throughout. Spleen enlarged by half as much again; soft; cut surface shows gelatinous appearance with complete absence of lymphoid follicles. Marrow of mid-femur soft and dark red with absence of bony trabeculæ. Histological examination (Prof. W. G. Barnard) showed active myeloid reaction in marrow from femur. There were many monocytes, but the predominant cells were of the myeloid series, and one of the most numerous was a primitive myeloblast. There was myeloid infiltration of the liver and myeloid transformation of the spleen. After seeing the Leishman blood-films and the supravital results, Professor Barnard agreed that this was certainly a monocytic leukæmia, despite the predominantly myeloid reaction in the marrow.

DISCUSSION

Clinically all three cases showed a rapidly fatal anæmia, with moderate enlargement of the liver, little or no splenic enlargement and no enlargement of the lymph-glands. Such a picture is perhaps suggestive of monocytic leukæmia, but may certainly occur in any acute leukæmia. In addition, two cases had an irregular fever, two showed small lesions of the buccal mucosa and two had phlebitis. In the Leishman films, the white cells showed features suggesting a monocytic origin—e.g., pseudopodia, indentation of the nucleus and other general characters of the cells. The differing opinions on these films expressed with equal conviction by various distinguished pathologists before they learnt of the supravital results showed that no generally acceptable diagnosis could be made on the fixed blood-films. The reports on the post-mortem histology of the bone-marrow in these cases shows that this may be no more useful a criterion and may be misleading, as in case 3, which in our opinion must be regarded as a monocytic leukæmia despite the histological appearances. On the other hand, an unequivocal diagnosis was obtained in all three cases by supravital staining.

Its value in these cases suggests that if supravital staining were more widely used monocytic leukæmia might be more commonly recognised. This would lead to a wider appreciation of the special characters of the Romanowsky-stained cells in this disease. Furthermore, a diagnosis of monocytic leukæmia made or confirmed by supravital staining is far more firmly established than when made on Romanowsky staining alone. The technique is simple, does not require any special apparatus, and, with a little practice, makes identification of even primitive monocytes quite easy.

We thank Dr. W. Allen Daley, medical officer of health of the L.C.C., for permission to quote from records of patients in Paddington and St. James' Hospitals; Dr. A. P. Piggot, deputy medical superintendent of St. James' Hospital, for allowing us to see cases 2 and 3; Prof. W. G. Barnard for his advice in the preparation of this paper; and Mr. A. Wyatt and those other persons who helped us in various ways.

SUMMARY

A simple technique for supravital staining is described which dispenses with the use of a warm stage or other special apparatus.

Three cases of monocytic leukæmia illustrated the value of this technique in the differential diagnosis of acute leukæmias.

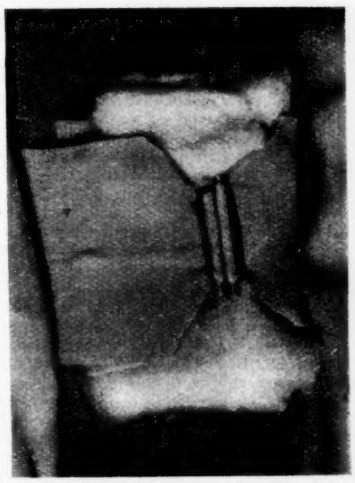
REFERENCES

Cunningham, R. S., Sabin, F. R. and Doan, C. A. (1925) *Publ. Carneg. Instn.* **17**, 229.
Lightwood, R., Hawksley, J. C. and Bailey, U. M. (1935) *Proc. R. Soc. Med.* **28**, 19.
Osgood, E. E. (1937) *Arch. intern. Med.* **59**, 931.
Panton, P. N. and Marrack, J. R. (1939) Clinical Pathology, London, p. 44.
Vaughan, J. M. (1938) British Encyclopædia of Medical Practice, London, vol. viii., p. 32.
Whitby, L. E. H. and Hynes, M. (1936) *J. Path. Bact.* **43**, 91.
— and Britton, C. J. C. (1939) Disorders of the Blood, London, pp. 405 and 533.

DRESSING OF OPEN WOUNDS AND BURNS WITH TULLE GRAS

By D. N. Matthews, M.Ch. Camb., F.R.C.S.
SURGICAL CHIEF ASSISTANT AND REGISTRAR AT WESTMINSTER HOSPITAL

Tulle gras is a dressing which has been in use in France for many years and has proved to be of great value. It consists of close-meshed curtain net cut into squares of suitable size and impregnated with soft paraffin (98 parts), balsam of Peru (1 part) and olive oil or other vegetable oil (1 part). The net is cut to fit a tin box some 5 in. square and 2 in. deep, and is packed in layers, each piece of net being separated by a sheet of white paper to facilitate its removal. The paraffin mixture (250 grammes for a tin of these dimensions) is added, and the tin is sterilised by heating for an hour at 150° C., after which it is sealed with adhesive tape.



Dressing an unsterile raw area at the thigh. A piece of tulle gras is laid over the area, a few layers of gauze soaked in saline are placed on this with a wool pad over all. The dressing is kept in place by two pieces of elastic plaster held together by a rubber band looped round match-sticks. This form of dressing allows of frequent renewal without the pain of pulling adhesive material from the skin.

During the last eighteen months experiments have been made on the addition of local anæsthetic to the paraffin mixture, and it has been found that 1% of powdered Decicain base is the most efficient. The quantity of decicain necessary adds about 4*s.* to the cost of each tin and Percaine was therefore tried instead. It was found that the addition of 0·1% of powdered percaine base * was nearly as effective and this adds only a few pence to the cost of each tin. In a concentration of 0·2% it occasionally caused some local irritation and tingling, and was twice suspected to be the cause of minor syncopal attacks, but no ill effects have been

* Decicain base or percaine base, which are fat-soluble, must be used rather than decicain or percaine, which are hydrochlorides and water-soluble. Percaine base is easily obtainable in this country. Decicain base must be prepared by dissolving the hydrochloride in water, making it alkaline with sodium bicarbonate, extracting with ether and evaporating.

observed either from percaine 0·1% or from decicain 1%. Any increase in temperature above 150° C. may decompose the anæsthetic and should be avoided. The temperature recommended is absolutely reliable for sterilisation.

The value of the local anæsthetic has of necessity to be estimated by observation and interrogation of the patient, but there is no doubt about the relief of pain it gives in an open wound, a burned limb, or a raw area left by the cutting of a Thiersch graft. Where possible advantage has been taken of the presence of raw areas on more than one limb, when one has been treated with the standard tulle gras without local anæsthetic and the other with the percaine preparation. The difference has been easily detected by patients of all degrees of intelligence.

Tulle gras is ideal for the treatment of all raw surfaces. If the surface is sterile, as in the area made by cutting a Thiersch graft, the tulle gras is left for ten days, covered with gauze and bandage, when the skin will be found to have healed painlessly. For unsterile wounds and burns saline packs, sulphanilamide powder or other dressing can be applied daily or hourly with no pain, as the tulle gras is left in situ until its replacement becomes necessary owing to the loss of the paraffin base and its contained anæsthetic (see figure). In cases of burns which are receiving a daily saline bath in addition to the regular saline packs the tulle gras may be allowed to float off when the limb is immersed and be replaced after the bath. This form of dressing has the additional advantage that owing to the open mesh of the net there is no risk of damming up discharge, which escapes freely into the overlying gauze.

I wish to record my appreciation of the coöperation of Mr. F. G. Hobart and all the dispensary staff of Westminster Hospital in this work.

Reviews of Books

Biological Aspects of Infectious Disease

By F. M. BURNET, M.D. Melb., assistant director, Walter and Eliza Hall Institute, Melbourne. London: Cambridge University Press. Pp. 310. 15*s*.

IN a preface Dr. Burnet hopes that his book may interest two classes of reader—the medical man who may find the biological approach to the study of infectious disease a "stimulating complement to the orthodox textbooks," and the layman with a general interest in biology in relation to human affairs. Man's ailments are undoubtedly becoming more and more of interest to the laity who will find in this volume the story of man's struggle for existence against his enemies, the pathogenic microbes, told in plain language. To the medical man, particularly if he has leanings to epidemiology, the tale may be fairly familiar, but it is reclothed and told in such a provocative way as to compel the reader to go steadily on. Beginning with the simple reactions of the protozoon, Burnet carries us on to an explanation of the response of the animal body to infection, and continually reminds us that in the host-parasite relationship the survival of the parasite is best served, not by the death of the host which would encompass its own destruction, but by a balanced condition which allows the parasite to continue its existence and growth. Such an equilibrium takes a long time to develop, which explains the ravages of a new disease or of one which has long been absent from the community.

One of the shibboleths of modern medical science is that the scientist should be content to state facts and not be tempted to interpret their possible meaning or to fit them to a particular hypothesis. Burnet in his researches has never been afraid to offer a broad interpretation of his findings or to deduce from them general principles. Here, too, he is always trying to find a rational explanation of natural phenomena—to explain the why as well as the how; why, for instance, a few of the bacteria and protozoa have acquired pathogenic powers; how the parasitic viruses have evolved (he inclines to the view that they are the diminutive descendants of pathogenic bacteria); how, why and where antibodies develop; what conditions and mutations make bacteria dangerous, and so on. He goes on to discuss the modes of spread of infection in a manner reminiscent of Theobald Smith's "Parasitism and Disease," and always gives apposite examples which display a surprising width of knowledge. Then follows a discussion of the genesis of epidemics with poverty and war emphasised as two of the most potent contributory factors. In speaking of the age-incidence of infectious diseases, Burnet is inclined to confuse morbidity and mortality, but he rightly states that in an unprotected community the infection is as a rule most severe in young adults (15–35 years), and he suggests an explanation on both a physiological and evolutionary basis. In the last section of the book some of the common infections—diphtheria, influenza, tuberculosis, plague, cholera, malaria, yellow fever—are used to illustrate methods of spread and control, and the author never hesitates to suggest possible explanations for vagaries in the natural history of these infections. In a final chapter, written in 1938, he comments on the alarming fact that most of the new diseases have affected the nervous system, and he attempts to predict what the future may hold in store for us.

Injuries of the Skull, Brain and Spinal Cord

Edited by SAMUEL BROCK. London: Baillière, Tindall and Cox. Pp. 632. 38*s*. 6*d*.

THIS collection of short monographs by twenty American and two British authors covers the whole range of injuries of the skull, brain and spinal cord, for the most part in sufficient detail to serve as a practical manual. The book has been carefully edited; there is little overlapping and where there are differences of opinion or terminology among the contributors the editor calls attention to them in explanatory footnotes. The chapters by Hassin and Symonds should help the general reader to bridge the difficult gap between the pathological changes and the clinical state in cerebral injuries. The contributions of Davidson and Elsberg on spinal-cord injuries are equally lucid and valuable. There are sensible chapters on the neuroses and psychoses following head injuries which recognise that the need for treatment does not stop when the patient has recovered from the acute phase, and the chapters on malingering and medico-legal aspects will be read with profit by both doctors and lawyers. The sections on the surgical treatment of traumatic intracranial hæmorrhage and compound fractures are adequate, but in the next edition a chapter might be added on the general management of acute head injuries, which depends so much on careful nursing and observation. There are many practical points of general application—e.g., details of tube-feeding, the risks of excessive dehydration, and control of the restless and noisy patient—which would be more accessible if they were gathered together in a separate chapter.

Experiences in Great Britain in war as in peace have shown that it is often impossible to obtain specialist services for the treatment of these injuries in the acute stage, and the subject deserves a wider interest among the general medical public and more emphasis in undergraduate teaching and the training of hospital residents. For those already in practice this book will be an accurate and informative guide.

Fundus Atlas

By LOUIS BOTHMAN, M.D., F.A.C.S., clinical professor of ophthalmology in the University of Chicago; and REUEL W. BENNETT, photographer for the division of ophthalmology in the university. Chicago: The Year Book Publishers; London: H. K. Lewis and Co. £5 10*s*.

THIS atlas consists of 50 standard sized stereoscopic photographs of the fundus reproduced in black and white on photographic paper. The pictures show the appearance of the fundus as seen by red-free light and were taken with the reflex-free Nordsen fundus camera and magnified three or more times the size of the original negative with a stereoscopic enlarger. The three-dimensional perspective thus produced gives a very realistic impression of existing elevations and depressions in the fundus structures. Each stereoscopic photograph is mounted at the bottom of a 6-ply card 7 × 9 in., on which is printed in good type a concise account of the fundus picture, the case-history, and the physical signs to be expected. All cards are numbered and indexed and are kept in a cloth-covered case. The photographs cover a fairly comprehensive field of fundus disorders and will be of value in teaching undergraduate and postgraduate students.

THE LANCET

LONDON: SATURDAY, JANUARY 11, 1941

THE MEDICAL PLANNING COMMISSION

FOR some months we have had occasional glimpses of the B.M.A. Medical Planning Commission in the process of formation. It was referred to in some detail by a Sunday newspaper at the beginning of September; again, with no enthusiasm, by Sir FRANCIS FREMANTLE in the House of Commons on Oct. 17; and with some misgivings by correspondents in our own columns. Then at the meeting of the B.M.A. council on Dec. 11 Mr. H. S. SOUTTAR, the chairman, explained its origin. He had suggested to the executive committee of the association that the time had come for the profession to give serious consideration to the problem of reconstruction and reorganisation in the field of medicine in the post-war era, and the committee had thereupon decided to appoint a commission "to study war-time developments and their effects on the country's medical services both present and future." The composition of the commission has now been announced, only a few places remaining to be filled, though additional members can be coöpted as required. As at present constituted the commission consists of 68 members, including 5 senior and some 23 other officers of the B.M.A., 11 nominees of the Royal Colleges in England and 3 of the Royal Colleges and Faculty in Scotland, 3 representatives of the Society of Medical Officers of Health, 1 of the Faculty of Radiologists, 2 of the Medical Women's Federation (the only women included), and 2 of the Parliamentary Medical Committee. General practice has no less than 21 members, and apart from the nominees there are 4 physicians, 4 general and 2 special surgeons, a dermatologist, 3 deans of medical faculties, a professor of preventive medicine, 2 distinguished representatives of the public-health services, an industrial medical officer, 2 pathologists and a radiologist.

There is justification for the B.M.A.'s claim to full representation, but their implied claim to an even age-distribution does not seem to be so firmly based. This is a commission appointed to plan for the future—a subject which the younger men justly feel is their own—and yet only 3 of the 68 members qualified since 1925, and none since 1929. Perhaps this defect will be made up by coöption later. The B.M.A. apparently recognise that such a vast body is likely to lack mobility, and its task will be to meet from time to time to consider large questions of principle, while entrusting details to small committees and sub-committees. In the past there has been a tendency for gatherings of this kind to regard themselves as more representative than they are, and to produce a finished scheme as agreed by the profession when nine-tenths of it have had no chance to approve or disapprove. Let us hope that the deliberations of both the main and the lesser bodies will be given wide publicity so that there will be ample opportunity for discussion, for their conclusions will profoundly affect not only our own livelihoods but the future health of the nation.

THE RETICULAR MAZE

Prof. L. G. PARSONS and Dr. J. H. EBBS[1] have described an unusual case of generalised angiomatosis. A girl of fourteen had a swelling on the upper part of her sternum which showed rarefaction in the radiogram; biopsy was performed but the histology was undetermined. About the same time it was noticed that she had an enlarged liver and spleen and orthochromic anæmia. Further radiograms showed widespread rarefaction and cyst formation in the bones, with little deformity, and curious opacities in the right lung. A diagnosis of the osseous form of Gaucher's disease was made although the biopsy and the lung changes might rather suggest generalised xanthomatosis. Radiotherapy was given without effect; the anæmia persisted, the bone changes became more extensive and the liver and spleen larger, but the girl remained in comparatively good health until the day before death when she developed signs of an acute infection; she had been under observation for just under two years. At the autopsy EBBS found a generalised cavernous angiomatosis affecting the liver, spleen, bones, lungs, pericardium, kidneys and skin. In discussing comparable conditions PARSONS and EBBS do not mention the analogous conditions reviewed by R. A. WILLIS[2] and E. BLONDEL[3]; recently H. RAHM[4] has described a somewhat similar case (although the post-mortem account does not make the extent of visceral involvement clear) in which the bony change was mistaken for generalised osteitis fibrosa and an unsuccessful search was made for a parathyroid tumour. PARSONS and EBBS maintain that the angiomata in their case arose simultaneously in their multiple sites, and not as embolic metastases from a primary neoplasm of the spleen or bones; but in view of the involvement of organs rich in reticulo-endothelial elements they discuss its possible relation to the reticulo-endothelioses.

In 1914, after GOLDMANN and KIYONO'S work with vital dyes and LANDAU and MCNEE'S investigation on cholestrin metabolism, ASCHOFF[5] propounded the concept of a system of cells scattered widely throughout the body, linked by a common capacity to absorb and in some cases to metabolise particulate matter, and suggested these cells could be recognised by their ability to absorb vital dyes. He proposed that this group of cells should be called the "endothelial metabolic apparatus" or reticulo-endothelial system. ASCHOFF'S grouping of these cells was entirely on a functional basis; the concept of cytogenic interrelationships was incorporated in later reviews, with a consequent confusion of thought. Later MAXIMOW[6] suggested that, in adult connective tissue, undifferentiated mesenchymal cells are present which are identical with those in the embryo and maintain their power of differentiating to all types of hæmic and connective-tissue cells; and ASCHOFF'S reticulo-endothelial system forms a part of MAXIMOW'S reticular system—it is one of the functional aspects of a complex morphological system. To speak of a lymphosarcoma or a systematised angiomatosis as a disorder of the reticulo-endothelial system is as inaccurate as calling a cancer of the body of the uterus a tumour of the

1. *Arch. Dis. Childh.* September, 1940, p. 129.
2. Spread of Tumours in the Human Body, London, 1937, p. 148.
3. Le tissu réticulo-endothélial du foie et ses tumeurs malignes, Paris, 1933, p. 57.
4. *Zbl. Chir.* 1939, **66**, 1890.
5. Die vitale Karminspeicherung, Jena, 1914.
6. *Physiol. Rev.* 1924, **4**, 533.

female hormonal system. It can be said that malaria is a disorder particularly affecting the reticulo-endothelial system, and the same may be true of certain forms of xanthomatosis. If this distinction between a functional and a morphological system is appreciated then much of the confusion of thought with regard to "reticulosis" and "reticulo-endotheliosis" should disappear. The term reticulo-endotheliosis should be restricted to conditions in which there is a proliferation of phagocytic cells, and it will be recognised that, with the exception of some rare lymphadenopathies, the majority of the true reticulo-endothelioses are reactive proliferations to abnormal elements (ranging from bacterial antigens to thorotrast) circulating in the blood-stream. The term reticulosis, however, is applicable to all the progressive hyperplastic conditions of the lympho-reticular tissue, as has been suggested by JOAN ROSS[7] and A. H. T. ROBB-SMITH.[8]

The relationship of the angioid proliferations to the reticular tissue is more complex; the embryonic vascular endothelium is capable of forming both vessels and blood-cells, but adult vascular endothelium is strictly limited in its potencies; vascular endothelial cells, apart from simple proliferation, can probably only change into fibroblasts. On the other hand, the venous sinusoids of the liver, spleen and bone-marrow are formed by a reticulin network on which are lying undifferentiated mesenchymal cells and phagocytic cells—the littoral cells of SIEGMUND—and (at least in the liver and bone-marrow) ordinary vascular endothelium as well. These vessels are, in fact, lined by a true reticulo-endothelium and there is evidence that they maintain full hæmic as well as histioid potencies in the adult. It is unfortunate that neither the photomicrographs nor the histology of the vascular changes in the case recorded by PARSONS and EBBS are brought out clearly enough to show whether the proliferation is one of angioreticulo-endothelium or of ordinary vascular endothelium. They do not say whether the living cells of the blood channels showed either hæmopoietic or phagocytic powers, and the evidence presented suggests that this is a case of simple generalised angiomatosis particularly affecting the hæmopoietic organs, rather than a proliferation of the littoral cells and their precursors. PARSONS and EBBS suggest that a similar clinical picture is found in conditions varying from angiomatosis to leukæmia; this is true enough if hepatosplenomegaly, anæmia and bone rarefaction are accepted as the sole clinical manifestations recognisable in these conditions, but careful hæmatological, radiological and histological examination should ensure an easy differentiation of all the groups mentioned. Biopsy should establish the diagnosis of all forms of reticulosis and reticulo-sarcomata recognised by the morphological pathologist. Accurate histological study of the lymphadenopathies has already produced a clear concept of the natural history of lymphadenoma verum (Hodgkin's disease in a strict sense) and of the various lipoidoses, and the recognition of lymphoid follicular reticulosis, histiocytic medullary reticulosis, leucopenic myelosis and myelosclerosis. To achieve a coördinated histological and clinical study of all the lymphadenopathies a central registry of the data is needed on the lines of the American bone-sarcoma registry. This would ensure that a sufficient body of material was available from which to draw conclusions and to which students might refer for advice and study.

7. *Brit. med. J.* 1939, **2**, 1029.
8. *J. Path. Bact.* 1938, **47**, 457.

DYSPEPTICS IN THE ARMY

THOSE working in hospitals which take military sick have known for some time that dyspepsia presents the largest single type of disease in the Army, and from several points of view the most important medical problem of this war. Mr. R. T. PAYNE and Dr. CHARLES NEWMAN[1] found that among the sick invalided back to England from France 12·5% had a primary diagnosis of gastric or duodenal disease. They investigated 287 cases of dyspepsia in the Army (201 from France and 86 from England) and found that this was not a new disease, as some said, or a neurosis, as others favoured, but was predominantly peptic ulceration, mainly duodenal, and that in nearly every case the man already had his ulcer before the war. Breakdown seemed to be due to the Army food which, though good, was too heavy for those prone to ulcers, many of whom had kept going at home by strict dieting.

From the military point of view, it is generally agreed that a man with a duodenal ulcer is of little use as a soldier. From the point of view of the taxpayer, although it is difficult to estimate the figure exactly, it is obvious that the mobilisation, equipment, maintenance, hospital treatment and disposal of this large number of men must have cost, and be costing, a great deal of money. It is therefore worth while, on all counts, to avoid recruiting men with ulcers, especially as many of them can do valuable work so long as they live at home on the diet which suits them. The traditional recruiting medical examination, which still continues, is an examination by physical signs. An active ulcer is difficult to diagnose by this means alone; a latent one impossible. A little verbal inquiry would surely save time in the long run. There should be a double aim in view: to ensure the exclusion of the enthusiast who wants to conceal his illness in order to get into the Army, and to avoid the exclusion of the man who hopes, by simulating an ulcer-history, to escape recruitment. The practical method seems to be, not to ask for details of the dyspepsia, but to find out if it had ever been serious enough to send him to a doctor or to a hospital, and then to refer to these. If the indigestion had not been bad enough to make the man seek advice, it is probably not bad enough to exclude him from the Army; and, although doctors are liable to unfair pressure in the matter of certificates, few doctors seriously suspect an ulcer without referring the patient to a radiologist or a hospital, so that in this instance it would be easy to get an unbiased opinion.

Some men with ulcers would still slip through, and there are a great many in the Army already. What is to be done with them? At present there seems to be a tendency to rely too exclusively on radiological findings. If the ulcer is visible the man is dealt with finally; if it is not he is liable to be sent back to duty, soon readmitted to hospital, and generally pushed from pillar to post for far too long. It is well known in civil practice that every ulcer

1. *Brit. med. J.* 1940, **2**, 819.

cannot be visualised by X rays, and the rapid disappearance of symptoms with rest, diet, cessation of smoking and so on, so far from being indicative of a minor dyspepsia, is used by many clinicians as an indication of an ulcer. In civil practice it saves suffering and money to investigate a case fully as soon as possible and deal with it appropriately. The same is true of indigestion in the soldier. Some of the temporising seems to come from the difficulties of diagnosis. It is not always easy to diagnose an ulcer without a good deal of care and trouble; it is generally true that an ulcer is either very easy or quite difficult to spot, and the clinical picture may be complicated by such things as the frequency of vomiting in duodenal ulceration in the Army. There are rumours that soldiers with indigestion are being insufficiently investigated on the plea of economy and labelled "soldier's stomach" or "gastric neurosis." A soldier is only a civilian dressed up in uniform, and his indigestion is the same as a civilian's, not some strange disease peculiar to soldiers. Moreover, a sick soldier is a patient entitled to the same consideration as a civilian. Army doctors are also civilians dressed up in uniform; would they be content with a diagnosis of "gastric neurosis" in their hospital outpatient clinics? Military organisation, which makes it impossible for one medical officer to see a case through to completion, does not encourage the best type of clinical work; the battalion M.O. who rises superior to difficulties and discouragements is doing work which is worthy of more recognition. The difficult cases need a careful analysis of all the evidence. A good many of the dyspeptic soldiers without actual ulcers are said to be cases of severe organic gastritis, which can be diagnosed with certainty only by gastroscopy. Before a man is stigmatised as a malingerer he ought to have the benefit of the appeal to direct inspection, and although it might be difficult for the Army to make the necessary arrangements many of the E.M.S. hospitals could provide facilities. The sorting of the serious cases in France for evacuation to the United Kingdom was efficiently done by the Army; and it would in the long run save a great deal of distress to the patient and much public money if suitable cases were as skilfully selected for complete examination.

INFLUENZA PROPHYLAXIS

THE demonstration by SMITH, ANDREWES and LAIDLAW in 1933 that epidemic influenza is due to a filterable virus has been followed by equally convincing evidence that the disease is one with several ætiological agents. Most attempts to isolate the virus from sporadic cases of influenza have been unsuccessful, and, apart from the "febrile catarrh" which STUART-HARRIS showed to be distinguishable on clinical grounds from influenza, there have been outbreaks clinically indistinguishable from epidemic influenza in which the virus could not be isolated. The negative serological findings obtained in 1939 by MARTIN [1] in Manchester and in some of the outbreaks in schools, hospitals and service institutions investigated by STUART-HARRIS and others [2] were cases in point. Nevertheless there is ample evidence from all parts of the world that the virus discovered seven years ago—now christened influenza A—is responsible for the majority of outbreaks, and specific prophylaxis even if it was effective against this one agent only would be of great value.

Clinical experience has suggested that recovery from an attack of influenza is followed by an immunity lasting probably about six months, and this was confirmed by LAIDLAW and his colleagues in animal experiments, so that there is good ground for hoping that artificial immunity might last equally long. Various methods of vaccination have been devised. ANDREWES and SMITH [3] have obtained a good immunity in mice and a good antibody response in man by the injection of formolised virus. FRANCIS and MAGILL [4] have advocated the use of active tissue-culture virus, since there seemed to be no risk of producing influenza by injecting living organisms either subcutaneously or intramuscularly. BURNET and LUSH [5] proposed administering living but avirulent egg-grown virus by the normal route of entry, the upper respiratory tract. Some fairly large-scale attempts to prevent influenza by such methods of specific immunisation have been made, but with uncertain results. One possible reason for this came to light just before war broke out, when it was demonstrated here and in America that the influenza A virus comprises a number of serological types, and it looked as though protection would only be attained by a vaccine containing all these types in adequate concentration—a difficult thing to prepare.

A way out of the difficulty seems now to have been found at the Rockefeller Institute, New York. HORSFALL and LENNETTE [6] found that a formolised vaccine made from the lungs and spleens of ferrets suffering from a simultaneous infection with the viruses of influenza and distemper produced a solid immunity in ferrets associated with a high titre of influenzal antibodies. This by itself is an encouraging observation since previous efforts to immunise the ferret by vaccination have been only partly successful. But, what is more important, HORSFALL and LENNETTE have also shown that the immunity evoked by the composite vaccine is a broad one, protecting the ferret not only against the strain of influenza present in the vaccine but also against antigenically unrelated strains. They have inoculated a small number of human volunteers with their composite vaccine and find that it evokes a good antibody response. Why its association with the distemper virus should produce this apparent antigenic broadening in the influenza virus is a mystery. The next step is a thorough trial of the composite vaccine in man, and it is proposed to try it in controlled series of Post Office workers this winter.

On March 1 Air Vice-Marshal H. E. WHITTINGHAM will succeed Air-Marshal Sir Victor Richardson as director-general of medical services in the Royal Air Force.

Dr. ANDREW DAVIDSON has been appointed chief medical officer for Scotland in succession to Dr. J. M. Mackintosh who now holds the chair of public health in the University of Glasgow. Dr. Davidson, who is a graduate of the University of Glasgow, is medical officer of health for the north riding of Yorkshire.

---

1. Martin, A. E. *J. Hyg., Camb.* 1940, **40**, 104.
2. Stuart-Harris, C. H., Smith, W. and Andrewes, C. H. *Lancet*, 1940, **1**, 205.
3. *Brit. J. exp. Path.* 1937, **18**, 43.
4. Francis, T. Jr and Magill, T. P. *J. exp. med.* 1937, **65**, 251.
5. Burnet, F. M. and Lush, D. *Brit. J. exp. Path.* 1938, **19**, 17.
6. Horsfall, F. L. Jr and Lennette, E. H. *Science*, 1940, **91**, 492.

Annotations

VITAMIN C FOR THE BABY

THE curtailment of imported fruit and the difficulty of obtaining oranges have led many mothers to wonder what they are to do about the orange juice which they had hitherto supplied, on the best medical advice, to their infants; and doctors are being asked about possible substitutes. The baby who is not receiving the advantages of breast feeding is exposed to the risk of scurvy if fed for too long—that is, for six months or more—exclusively on dried milk, condensed milk, boiled cow's milk or one of the patent foods. But this is not the whole story. Scurvy in its full-blown clinical state is a rare malady, but surprisingly is common among the better-off section of the population where it may be presumed that the purchase of oranges, lemons or grape-fruit has been customary in the past, and easier than in poorer families. Some will argue, however, that although fully developed infantile scurvy is rare a subscorbutic state is common, may be responsible for some cases of anæmia and certainly contributes to producing ill-health and increased susceptibility to infections of all types. Even if some more conservative pædiatricians refuse to accept this picture of a subscorbutic state all would probably agree that a wholesale restriction in the vitamin C available would certainly lead to an increase in the number of cases of infantile scurvy. As the shipping problem is one of space it seems rational to consider whether the essential contents of the citrus fruits—their vitamin C—could be obtained in smaller bulk. Dried orange, lemon and grape-fruit juices are listed in the Medical Research Council's publication "Vitamins: a Survey of Present Knowledge" (1932) as + + + for vitamin C. Might not the citrus-fruit growers be persuaded to squeeze the fruit in the country of origin and send us only the concentrated or dried juice, thereby saving the space of the peel and pulp? But many will reply that orange powder would never be eaten, and the same objection will be raised to ascorbic-acid tablets, which would eliminate shipping altogether. It may be more profitable to consider why poorer class infants rarely get scurvy. Possibly this is because their parents are unable to afford the patent foods which are so often the antecedent diet in infantile scurvy, but a more hopeful explanation lies in the fact that in poorer households babies receive earlier mixed feeding—officially or unofficially—than in more carefully regulated nurseries. Early mixed feeding is now becoming generally accepted in infant-welfare work and starts with "bone and vegetable broth" at six months. In some parts of the world vegetable purées are given even earlier. Vegetables, grown in this country, are the practical alternative to imported citrus fruits. Contrary to a widespread belief which should be emphatically denied by food experts, cooking, if rapid, does not destroy vitamin C. Thus the addition of swedes, cabbage, peas and carrots, sieved at first, to the infant's broth will supply vitamin C; and it is also worth recalling that dried peas and beans develop vitamin C if allowed to sprout. But the potato is the most satisfactory alternative to orange juice. Cooked in its skin, the potato retains a large portion of its vitamin C and cooked after peeling the central portions are similarly of value. In the seventeenth century the popularisation of the potato by James I abolished the endemic scurvy of the nation. The greater use of potato for the early mixed feeding of infants might likewise solve present-day problems.

CARBONIC ANHYDRASE

WHEN a discovery is made in physiology or one of the other sciences ancillary to medicine, there is generally a lag period of a few years before the new knowledge begins to be applied to medicine itself. Carbonic anhydrase has now passed through this sequence of events. The enzyme was discovered by Meldrum and Roughton [1] in 1932–33 to be a normal constituent of the red blood corpuscle and to accelerate the evolution of carbon dioxide from the blood. What more natural then than to study the concentration of the enzyme in the corpuscles in health and disease? The strange thing is that it has not been done before. Now a study has been made of normals of various ages, and of diabetics with and without tuberculosis.[2] It seems that only minor differences were found between the sexes, but that the younger normals tended to give higher values than the older ones. The figures in healthy diabetics were higher than in normal persons; in the diabetics with tuberculosis the titres were lower and scarcely different from the normals. Values were not affected by the height of the blood-sugar. The ranges of these different groups overlapped each other to a considerable extent, and the data were not subjected to statistical treatment so that the differences may not even be significant. The determination has evidently no diagnostic value in the limited field surveyed up to date. But this is only a beginning. A determination of the carbonic anhydrase may well turn out to be of interest in diseases in which immature or otherwise abnormal red blood corpuscles find their way into the circulating bloodstream.

ERGOT AND ITS ALKALOIDS

THE undergraduate confronted with the study of materia medica reads in his textbook that ergot is the sclerotium of *Claviceps purpurea* Tulasne, arising in the ovary of *Secale cereale* Linn. and in anguish he cries "Can these dry bones live?" Yet in the history of galenicals such as opium, digitalis and ergot there are reflected many of the joys and sorrows of mankind. When the student is considering ergot he must give rein to his imagination and rove among the peasants of Spain and Russia who gather the drug for us, and he will find it a subject with fascinating ramifications into folk-lore, religion, epidemiology and even the fortunes of war. Ergot has yielded an astonishing crop of pharmacological discoveries, and it is unlikely that we have seen the last of them. The position has lately been reviewed by A. C. White,[3] who explains that at least five active alkaloids exist in different ergots, and each has a less active isomeride. Smith and Timmis [4] point out that these alkaloids can be arranged in a lævo-rotatory group which are pharmacologically active and a dextro-rotatory one which are much less so. In the active group are ergotoxine, ergocristine, ergotamine, ergosine and ergometrine; in the inactive group ergotinine, ψ ergotinine, ergocristinine, ergotaminine, ergosinine and ergometrinine. They resemble the dancers in a reel in that they may perform alone or linked with weaker partners. Apart from various amines and acids ergot may also contain at least fourteen alkaloids consisting of equimolecular complexes of dextro- and lævo-rotatory alkaloids. The potentialities and pedigrees of these are still largely unknown, but in several instances their component parts are the common alkaloids of ergot. Thus sensibamine is merely an equimolecular complex of ergotamine and ergotaminine, and in the hands of the Koflers [5] the lowly origin of the others will no doubt be exposed; but the pharmacological follow-up has scarcely begun. More respect must be paid to ergomonamine, for Holden and Diver [6] have shown it to be of totally different type. White gives a valuable epitome of the pharmacological and toxicological effects of the ergot alkaloids in the fowl, cat, rabbit and mouse, and mentions

1. Meldrum, N. U. and Roughton, F. J. W. (1932) *J. Physiol.* 1932, **75**, 3; *Ibid*, 1933, **80**, 113.
2. Shiskin, C. *Tubercle*, July, 1940, p. 322.
3. White, A. C. *Edinb. med. J.* December 1940, p. 789.
4. Smith, S. and Timmis, G. M. *J. chem. Soc.* 1936, p. 1440.
5. Kofler, A. and Kofler, L. *Z. angew. Chem.* 1937, **50**, 620.
6. Holden, G. W. and Diver, G. R. *Quart. J. Pharm.* 1936, **9**, 230.

that in the human subject the acute symptoms that they produce in the central nervous system include drowsiness and disturbances of temperature regulation and respiration; as he points out, this triad strongly suggests some hypothalamic site of action for these alkaloids. The observation is far from being merely academic, for the use of ergot alkaloids in migraine foreshadows a widening field of clinical application. The pathogenesis of convulsive ergotism is even more obscure. White says that the nearest he ever approached to observing convulsive action was when he noticed an occasional retraction of the head which might last some time and rarely an athetoid movement of the forelimbs. He is attracted by Mellanby's [7] suggestion that convulsive ergotism is explained by vitamin-A deficiency on which chronic ergotism is superimposed. As yet this view has not gained general acceptance, and it is unlikely that any conclusive work will be done on the subject in the so-called civilised countries, where gross deficiency of vitamin A is comparatively rare. In some parts of the world, however, the widespread occurrence of xerophthalmia indicates that vitamin-A deficiency is common, and in such regions it should be possible for clinicians interested in experimental medicine to settle the issue.

MALE INFERTILITY

STERILITY and sub-fertility in the male are complex subjects, entailing exhaustive urological, endocrinological and laboratory studies. Progress made in the last ten years has been well summarised in three articles by H. A. R. Kreutzmann, S. R. Meaker, S. N. Vose and C. W. Charny.[8] Cases may be divided into two groups: urological and endocrinological. The commonest cause of sterility in the first of these groups is a previous attack of gonorrhœa resulting in bilateral epididymitis, stenosis of the ejaculatory ducts and chronic vesiculitis and prostatitis; more rarely the condition is congenital and due to cryptorchism, hypospadias or abnormal attachment of the epididymis to the testis. Endocrinological causes are, however, responsible for more cases of sterility and sub-fertility than urological, the majority of them being due to hypoplasia of the testis, pituitary dysfunction and hypothyroidism. Examination of the patient must include a careful history, a complete medical overhaul and a somewhat elaborate semen examination. All authorities are now agreed that the quality rather than the quantity of the spermatoza provides the best index of the patient's fertility. The old idea that a man with a spermatozoon count below 60,000,000 is to all intents and purposes sterile is now abandoned, for there have been many instances of conception with counts much below this figure. It is far more important that the proportion of abnormal spermatozoa should not be above 20–25%. Although endocrine disturbances are sometimes found which explain the abnormalities of the semen, more often than not the patients appear healthy, and all examinations—such as that of the metabolic rate—give normal results. Usually pituitary dysfunction is postulated, although no evidence of this can be discovered. Diagnosis is ahead of treatment. Consistently good results follow endocrine therapy only in cases due to hypothyroidism. Kreutzmann found that the administration of testosterone gave no result. Meaker and Vose emphasise the importance of dealing with any chronic infection, since bacterial intoxications have a decided effect on spermatogenesis. Charny describes the technique and discusses the place of testicular biopsy in the investigation of a case of male infertility. He points out that it is a simple innocuous procedure, and that it is not only a definite diagnostic aid in differentiating between obstructive and non-obstructive semen defects but that it is of the greatest value in prognosis. Since we are still in the dark as to the best method of treating these cases, testicular biopsies carried out before and after treatment yield the most direct evidence of the efficiency of the therapeutic agent employed. These papers may help to draw attention to the need for adequate investigation of the husband when marriages are childless.

7. Mellanby, E. Nutrition and Disease, Edinburgh, 1934.
8. *J. Amer. med. Ass.* Oct. 26, 1940.

TOXICITY OF SULPHATHIAZOLE

ALL really potent drugs seem to be two-edged weapons and the sulphonamides are no exception. Of the toxic effects of these drugs, those on the blood-cells are rightly dreaded since agranulocytosis is often fatal and methæmoglobin formation and anæmia are always liable to appear if treatment is at all prolonged. Moeschlin and Hurschler [1] now claim that one of the virtues of sulphathiazole is that it is much less toxic for the red cells than sulphapyridine. Their evidence is indirect. They noticed that in the blood of about 50% of patients receiving sulphapyridine some of the red cells when stained supravitally with brilliant cresyl blue showed a definite intracorpuscular granule situated as a rule at the periphery of the cell; these granules were sometimes, but not commonly, found in reticulocytes. In patients treated with sulphathiazole, however, the red cells did not show these granules at all. To confirm this observation they gave the two drugs to groups of white mice. Sulphapyridine produced the e granules in the red cells of about 75% of the animals and the percentage of affected red cells ran roughly parallel with the size of the dose. But sulphathiazole even in much larger doses and given for long periods did not cause the granules to appear. The nature of these intracorpuscular granules is not known but they have been found when methæmoglobin formation has occurred and they may be produced by hæmolytic drugs such as phenylhydrazine; they seem to be definitely connected with the toxic action of drugs on the red cells and hence Moeschlin and Hurschler conclude that sulphathiazole is less toxic than sulphapyridine.

Sulphathiazole is excreted more rapidly than sulphapyridine and the maximum concentration of sulphathiazole in the serum is neither so high nor maintained for so long as that of sulphapyridine. Moeschlin and Hurschler consider these points but do not think that they are decisive; they incline to a chemical explanation and suggest that the absence of the pyridine ring may render sulphathiazole less toxic to red cells. The question of the liability of sulphonamide drugs to produce methæmoglobin has been investigated by Rimington and Hemmings.[2] They noticed that as a rule substances which produced porphyrinuria were also capable of producing methæmoglobin in vivo; after examining several of these and related substances they concluded that it was the presence of a free, or potentially free, aromatic amino group that determined whether a drug could produce methæmoglobin and was therefore liable to be toxic. They did not examine sulphathiazole, but since it has a free aromatic amino group like sulphapyridine, it is by this criterion also liable to be toxic.

The explanation of sulphathiazole's diminished toxicity is clearly not yet settled and it seems premature to recommend, as Moeschlin and Hurschler do, the wholesale substitution of it for sulphapyridine in all but a few special cases. A better course seems to be that recommended by Gaisford and Whitelaw [3] in the treatment of pneumonia—to give sulphapyridine at first in order to get the maximum concentration in the serum as soon as possible and gradually replace the sulphapyridine by sulphathiazole in subsequent doses. This mode of treatment exploits the pharmacological advantages of both drugs.

1. Moeschlin, S. and Hurschler, H. *Schweiz. med. Wschr.* Oct. 12, 1940, p. 972.
2. Rimington, C. and Hemmings, A. W. *Biochem. J.* 1939, **33**, 960.
3. Gaisford, W. F. and Whitelaw, W. *Lancet*, 1940, **2**, 451.

NURSE AND PATIENT

MISS RUTH GILBERT, supervisor of social work in the community psychiatric service of Newhaven, Conn., has written a book on mental hygiene for nurses dealing with the mental adjustment of patients, and of nurses to their patients and contacts. It is an American book, but the essentials of nursing are the same everywhere, so the book is nearly as valuable on this side of the ocean as on the other, and we have no work strictly comparable to it. Its title, "The Public Health Nurse and Her Patient," [1] is somewhat misleading, for though it treats fully of the mental management of the sick and the psychology of sick nursing it deals equally fully with the psychology of health visiting and the dispensation of health to the general public. It is most opportune, for nursing, and particularly public-health nursing, in Britain during its battle is dominated by emotional difficulties caused by war. The material side of nursing is not so much affected by circumstances, though war by its restrictions of apparatus and agents adds to its difficulties. But the mental state of the population in war-time is far from normal and public-health nurses working in air-raid shelters, in bombed homes, or amongst evacuees meet an atmosphere of tension, fears and excitements different from that with which they are familiar in times of peace. Not only the health but much of the morale of the people depends on our public-health nurses. This will be fully appreciated by anybody who watches the activity of an efficient nurse in a shelter bringing comfort to a stricken crowd and allaying the confusion which may be the prelude to panic. Success depends mainly on her personality, but a knowledge of the technicalities of practical psychology, such as Miss Gilbert provides, greatly helps to develop her personality and adjust it to her special task. The relief of distress lies neither in pity nor negation, but in understanding its mental processes. The expression "I am not going to hurt you" may cause more alarm than pain itself, and pity will do the same. So in dealing with the distresses of war it is useless to pity the sufferers or deny their suffering, but relief can be given by convincing them that the nature of the suffering is understood and that the appropriate remedy will be applied. It has been known from the beginning of medicine that trust in the physician is the most potent of all his remedies, for though it cures no disease it enables the patient to adjust himself so that he can be cured. A knowledge of how this trust can be attained is of even greater value to the nurse than to the physician, for she is longer with her patient and enters into a more intimate relationship with him.

HEPARIN VERSUS ADHESIONS

FURTHER progress has been made by E. P. Lehman and F. Boys [2] in their experimental study of the prevention of peritoneal adhesions by heparin. Their earlier work suggested [3] that we have in heparin a useful weapon against this complication of abdominal operations, but the occurrence of intraperitoneal hæmorrhage in 3 of the 24 dogs used in their investigations pointed to the necessity for further study of the technical details. Lehman and Boys have since operated on 75 more dogs without postoperative hæmorrhage and it appears therefore that the three earlier mishaps were due to imperfect hæmostasis. From their more extensive observations they conclude that heparinisation of the peritoneal exudate in dogs inhibits the re-formation of divided intra-abdominal adhesions. Their study of the dosage required for optimum results is, however, still incomplete. It seems clear that more than two intraperitoneal doses are necessary but the minimum effective dose per day for three administrations has not yet been determined. While Lehman and Boys are satisfied that heparin, given in this way, is both effective and safe they consider that the time has not yet arrived when it can be used clinically. Postoperative paracentesis seems inadvisable in human subjects but it may be found practicable to introduce the later doses of heparin either through the blood-stream or by drip through a rubber tube at the time of operation.

1. London: Humphrey Milford, Oxford University Press. Pp. 396. 13s. 6d.
2. *Ann. Surg.* November, 1940, p. 969.
3. See *Lancet*, 1940, **1**, 743.

THE SHELTERS SPONSORED

THE Ministry of Health and the Ministry of Home Security, to do them justice, have always been willing to recognise the public shelter as the product of their own uncertain union, but they have only just made up their minds which parent the little one ought to turn to when afflicted with growing pains. However, all is now as merry as an affiliation order: the Ministry of Home Security (a father-figure, as Dr. Jane Suttie would see it) will be responsible for the number, location and construction of premises, while the Ministry of Health, like a capable mother, will look after the comfort, morals and management of the shelter and its safety from the point of view of health. As nursemaid, the Ministry of Food will make sure that the child gets proper meals by keeping the canteen stocked. This division of labour seems very sensible; unity of control has been ensured by delegating the administration of shelter management to the regional commissioners with the local authorities as their agents. Alderman Charles W. Key, M.P., has been appointed regional commissioner for the London civil-defence region, in place of Mr. Euan Wallace, the senior regional commissioner, who has had to retire from ill health. Provision of bunks, lighting and heating and canteen accommodation may now be expected to proceed more rapidly. Besides being responsible for these, the Ministry of Health, through the regional commissioners, will supervise sanitation, precautions against infection and public order in the shelters. The Ministry of Home Security will meanwhile obtain and equip more basement shelters; more than 600 basements have been turned into public shelters in the last three months, providing accommodation for 100,000 people, but more will be welcome. Shelters in provincial target cities will be improved at the same time, and plans for shelters for suburban dwellers are being considered. Two experimental indoor shelters are now being produced. By the end of the war we shall probably be as contented a race of troglodytes as any in Europe.

VOLUNTARY HEALTH INSURANCE IN NEW YORK STATE.—A report by the medical economics committee of the Westchester County Medical Society complained that the number of medical expense insurance companies and health insurance companies licensed to operate in the state since 1938 by the State Social Welfare and State Insurance Departments is so great that all such plans are now in financial jeopardy. "The medical society," it is stated, "has given its support for several years to the idea of voluntary medical expense insurance. The society would be sorry, indeed, to see this idea discredited because of the failure of a myriad of shoestring organisations." In reply to this charge, Mr. Louis D. Pink, State Superintendent of Insurance, states that there are but three companies licensed in the whole state of New York and only one of these is in the metropolitan area. Permits have been granted to five other organisations in New York City to organise under the provisions of the 1939 law. All of these plans are organised on a non-profit basis. In all of them there is a provision that the physicians will agree to accept a pro-rata share of the income of the organisation in case there is not sufficient funds to pay them the complete amount of their schedule. The State Insurance Department recognises that some of the plans may not succeed but believes that wide experimentation is desirable. "If," remarks Mr. Pink, "these doctors who are criticising would try to get behind this plan and put it over, instead of going around making speeches, the plans might be a success."

Special Articles

A MEDICAL EXAMINATION OF 1592 WORKERS

By J. N. Morris, M.A. Glasg., M.R.C.P.

Statistics and analyses of mortality in this country are available in abundance, but statistics of morbidity are most incomplete, and for adults accurate figures are available only for notifiable infectious disease.[1] The present report may therefore be of interest. Shortly before the war I examined 1592 workers, employees of a Midlands corporation, who had simultaneously become eligible under the Local Government Superannuation Act 1937; they included 1352 men and 240 women. The women were too few for any striking facts to emerge, and detailed results will be presented only for the men. Applicants filled in a questionnaire on their own and their family history. A full physical examination was then made of each. Many were seen twice and a few three times; some 60 were sent for a second opinion to members of the consulting staff of the local municipal hospital. The pathological and X-ray facilities of the hospital were freely used; though it was not possible to do routine radiography of the chest or examine the cerebrospinal fluid.

Findings in Male Workers

The distribution in *age-groups* was as follows:—

Age	No.	Age	No.
17–29	290	40–49	319
30–39	468	50–64	275
		Total	1352

This distribution is on the average somewhat older than that of social classes III and IV in the Registrar-General's Occupational Mortality Supplement for 1931.

Occupations.—There were 1290 manual workers, skilled, semi-skilled and unskilled, on the staff of the various corporation departments (city engineers, electricity, gas, water, housing, parks, baths) and 62 non-manual workers (nurses, clerks and foremen).

The disorders found in those examined are set out in the table.

FINDINGS IN 1352 MEN

	Cases		Cases
CARDIOVASCULAR		Syphilis	13
Congenital heart disease	4		
V.D.H.	13	CHRONIC RHEUMATIC	
Hypertension	24	Osteoarthritis	12
Disease of blood-vessels	5	Fibrositis	8
Varicose veins	252	Spondylose rhizomélique	1
ALIMENTARY		OCCUPATIONAL	
Dental disease	1327	Cement dermatitis ..	3
Chronic tonsillitis ..	15	Pitch wart	1
Peptic ulcer	4	Chronic carbon-monoxide poisoning	4
Chronic dyspepsia ..	48		
Diverticulitis	1		
Hernia	90		
RESPIRATORY		MISCELLANEOUS	
Chronic bronchitis and emphysema ..	43	Defective hearing	87 (of 903)
Asthma	3	Defective vision ..	280
Bronchiectasis	3	Cataracts	6
Fibrosis of lung	1	Iritis	1
NERVOUS		Deformity of feet ..	373
Post-concussion syndromes	4	Orthopædic deformities	9
Migraine	2		
Miscellaneous	12	Chronic eczema ..	5
		Psoriasis	5
GENITO-URINARY		Scabies	1
Bright's disease ..	5		
Urinary infections ..	2	Obesity	35
Oxaluria	3		
Senile enlargement of prostate	2	Anæmia	28
Hydrocœle	6	Leukæmia	1
Varicocœle	11	Purpura	5

1. Important information is contained in the report (vol. i) of the Ministry of National Service, 1920; in the reports of the chief medical officer of the Ministry of Health for 1924, 28, 33; and in the annual report on incapacitating sickness published by the Scottish Board of Health.

Absentees.—Only workers on the "live" register of their departments were called for examination, and 20 did not turn up because of sickness. These diagnoses were obtained from the medical certificates of absentees: pulmonary tuberculosis (2 cases), pleurisy (1 case), chronic rheumatism (3 cases), high blood-pressure and injury to the chest (1 case), other injuries (2 cases), rheumatism with heart failure, cardiac asthma, bronchitis, acute appendicitis, scarlet fever, chronic colitis, gastritis, prolapsed hæmorrhoids and neuralgia (1 case each).

CARDIOVASCULAR DISORDERS

Heart disease.—A history of "juvenile" rheumatism was obtained in 29 men (2·1%)—rheumatic fever 23 cases, "subacute" rheumatism 3 cases, chorea and rheumatic fever 2 cases, chorea 1 case. Obvious cardiac lesions were found in 8 of these 29 men: mitral stenosis and aortic regurgitation 1 case; mitral stenosis 3 cases; mitral regurgitation (with an organic murmur and cardiac enlargement) 4 cases. Another 5 men had valvular disease which was very likely rheumatic, though a definite history could not be obtained: mitral stenosis and aortic regurgitation 1 case; mitral stenosis 1 case; aortic regurgitation (with negative blood Wassermann reaction and no radiological aortic enlargement) 3 cases. This makes a total of 13 cases—just under 1% of the men examined. Only 1 of the 13 had any symptoms; 2 knew that there was "something wrong with the heart"; none had made any arrangements for periodic medical examination; several were in unsuitable jobs; in only 2 of the 13 was the dental condition satisfactory.

Hyperpiesia.—Using the arbitrary diastolic base line of 105 there were 24 cases of hypertension; 13 had symptoms.

Blood-vessels.—There were 1 case each of angina pectoris, intermittent claudication, femoral thrombosis, post-traumatic elephantiasis, angioneurotic œdema.

TEETH

The teeth were examined, a hand-torch and wooden spatula being used. In the whole series, 539 men, or 39%, had dentures, either one or two plates, at the time of the examination. The rest were graded as follows: grade 1, satisfactory, no defects requiring treatment observed; grade 2, fair, up to six cavities, roots, stumps, early pyorrhœa; grade 3, poor, more than six lesions, severe pyorrhœa, teeth inadequate for mastication. Most of the teeth in grade 3 (34% of the men in the series) were beyond conservative dentistry. Results at different ages were:—

Age	Dentures %	Grade 1 %	Grade 2 %	Grade 3 %
17–29	15	7	49	29
30–39	38	1	27	33
40–49	48	0	16	36
50–64	59	0	6	35

Dental hygiene.—Of 415 consecutive men questioned 125 (30%) brushed their teeth daily; 131 (32%) brushed their teeth less than once daily, but once or more a week; 152 (37%) brushed their teeth less than once a week, most of them not at all. A few devices were unclassified—e.g., a weekly rub with soot, or an occasional wipe with a towel.

Dental treatment.—Many of the men probably started life with poor teeth. Ignorance of the value of conservative dentistry was therefore all the more serious. It was rare to meet anyone who visited his dentist regularly, and throughout there was an indifference if not actual antagonism to dental treatment.

I wondered if, as fathers, the men examined took more interest in their children's teeth than in their own. It appeared not. The reports of the local school dental officer bear this out. The men I examined were probably a fair sample of the local elementary-school parents, and acceptance rates for dental treatment at the council schools were as follows:—

Year	Needed immediate treatment (%)	Actually received treatment (%)		
		At school clinic	By private dentist	Total
1936	70·9	23·9	2·2	26·1
1937	71·4	24·2	2·5*	23·7

* Estimated.

Ignorance and apathy are not the only difficulties. Many of the men told me that their approved society granted little or no dental benefit. Many others, for some reason, were ineligible.

ABDOMINAL CONDITIONS

Hernia.—Of 75 men who were ruptured, 15 had bilateral inguinal hernia, 55 unilateral, and 5 had a hernia of the umbilicus or abdominal wall. Counting the cases of bilateral hernia as two, there is a total of 90 hernias. Only 36 of the men had a satisfactory truss; 8 had a truss which was inadequate and 46—just over half—had no truss at all, despite the fact that their hernias were often very large and that some had a history extending over many years. In addition to these men, 28 had scars from previous operations for hernia; 21 of the scars were satisfactory; in 7 the hernia had recurred.

Operations.—10 men had been operated on for peptic ulcer and 57 (4%) for appendicitis.

Purges.—61% of the men dosed themselves with patent medicines. Most of these took their medicine regularly, the "week-end clear-out" being particularly popular; very few took purges because they were constipated. In most the habit was so well established that no reason for it was immediately forthcoming. On consideration the commonest answer was that they "felt better" for the "clean-out," "clear-out," or "flush."

PULMONARY TUBERCULOSIS

Two men with pulmonary tuberculosis and a third with pleurisy did not present themselves for examination. No definite cases of tuberculosis were discovered among the 1352 examined. The findings of mass radiography elsewhere suggest that it is highly unlikely that there were no cases of pulmonary tuberculosis in the series. Although routine radiography could not be done, all cases with anything suspicious in family history, personal history or physical signs were examined radiologically. Among these—more than 100—there were only 4 doubtful shadows on the films. No certainly active lesions were found in this way.

SYPHILIS

There were obvious stigmata of congenital syphilis in 2 men; 1 man was under observation at a local V.D. clinic; 2 others had obvious tertiary lesions. These all had negative blood Wassermann reactions. More interesting was a group of 8 men with neurosyphilis. None gave a history of old syphilitic infection, none had any idea that he was suffering from syphilis, none was under observation or treatment, and none was disabled.

1. Age 34, Argyll-Robertson pupils only; blood W.R. positive.
2. Age 41, well-marked tabes; lightning pains and bladder trouble; blood W.R. negative.
3. Age 41, tabes; large gummatous ulcer of leg; blood W.R. positive.
4. Age 44, tabes with dementia; scar on penis; blood W.R. negative.
5. Age 47, tabes; blood W.R. positive.
6. Age 55, meningo-mesencephalitis with papillœdema; blood W.R. positive.
7. Age 58, tabes; atrophy of testes; blood W.R. doubtful.
8. Age 60, tabo-paresis; gummatous scarring about mouth; blood W.R. negative.

NERVOUS SYSTEM

There were 4 cases showing post-concussion syndromes, 2 cases of migraine, 1 case of each of the following: residual hemiplegia, chronic alcoholism with epilepsy, postencephalitic parkinsonism, localised and arrested progressive muscular atrophy, Adie's syndrome, brachial neuritis, traumatic anæsthesia of leg, congenital torticollis, congenital nystagmus, old poliomyelitis, spastic diplegia, sciatica, and von Recklinghausen's disease.

Neuroses.—The method of examination did not allow of an investigation into possible psychological abnormalities; but 8 men suffered from advanced chronic anxiety states, 1 had obvious hysterical phenomena.

HEARING

Since there is little information on the incidence of deafness, a special questionnaire on hearing was filled in, the form used being the one recommended by Miss Tookey Kerridge.[2] This inquiry was not begun till a few weeks after the investigation as a whole, but 87, or just under 10%, of the 903 men investigated complained of defective hearing; in most cases the defect was unilateral. There was an acute rise in the incidence with age, from 5% at 17–29, to 17% at 50–64. In 13 of these cases the drums were obscured by wax, in 51 there was evidence of middle ear disease (29 present, 22 past), in 23 no possible ætiology was found.

2. *Lancet*, 1939, 1, 1178.

VISION

Of all the men examined 280, or 21%, had vision with both eyes of 6/12 or less. The incidence of this degree of visual defect was 11% in the 17–29 group, 15% at 30–39, 18% at 40–49, and 45% at 50–64. Of the 280, 38% had glasses which improved their vision; 61% had no glasses. A few had glasses which did not correct the defect.

FEET

Flat-foot was found in 63 men, of whom 12 complained of some pain. There were deformities of part of the forefoot in 310 men (i.e. 23%) such as hallux-valgus complex or toes crushed together so that they overlapped. There was a rising incidence with age. The feet were rarely normal. Many of the men had abnormal crowding of the toes, though not severe enough to produce overlapping. Corns and callosities were too many to count. Whatever else may be responsible, the frightful shoes worn were only too obviously implicated. But even with gross anatomical abnormality there was little if any disability, and skin-pain apart, no discomfort.

ANÆMIA

Many men in the series were clinically suspected of anæmia. When hæmoglobin estimations were made on these the anæmia was confirmed in only 28 cases, their percentages ranging from 58 to 85 (Haldane). In only 6 was a likely cause (e.g. bleeding piles) obvious. There was one case of chronic lymphatic leukæmia in a man aged 46. He had no symptoms but was rather pale and had glands in the axillæ.

UNDIAGNOSED CASES

In several cases no final diagnosis could be made. These included men with Horner's syndrome (2 cases), heavy albuminuria with no other signs or symptoms (2 cases), thrombo-phlebitis migrans, olecranon bursitis, acute arthritis, suspected chronic cholecystitis, and 1 case of suspected psychosis.

Findings in Women

Of the 240 women, 182 were under thirty. Apart from 47 laundresses, cleaners and the like, they were non-manual workers, most of them being nurses (a preselected medical sample). Two did not present themselves for examination because of pulmonary tuberculosis, and 2 were recovering from operations for malignant disease. Of those examined 13 gave a history of juvenile rheumatism (just over 5%) and there were 6 cases of rheumatic carditis, an incidence of 2·5%. The dental condition in those under thirty was similar to that of the men, but in those over thirty it was much worse. Hæmoglobin estimation in 191 consecutive cases showed an average of 93·4% Haldane with a range of 45–108%; 39 were below 85%; 23 women complained of menorrhagia; and of these 17 had a hæmoglobin of less than 85%. Apart from 7 endocrine disorders—1 case of Graves's disease, 1 of simple goitre, 2 of myxœdema and 3 with menopausal symptoms—there is nothing of interest to report. The chests of almost all nurses were examined radiologically, and in 2 suspicious shadows were found. Deformities of the feet were commoner than among the men (35% of all examined); there was little change with age.

Discussion

All the men and women examined were under national health insurance. The general standard of health cannot, therefore, be considered satisfactory. Of the 1592 examined, 112 (7%) would probably have been rejected for life insurance, and might, therefore, be described as suffering from major disorders; many more would have been weighted. Minor disorders were legion and included bad teeth, dyspepsia, hernia, chronic bronchitis, defects of hearing and vision, anæmia, varicose veins and deformed feet.

Of the 112 men and women in whom major disorders were found, 12 were, or had recently been, under medical

care at the time of the examination. Similar records showed that in the case of varicose veins, a minor disorder, of the 252 men who had the condition, only 7 had ever consulted their doctors about it. For the most part both major and minor disorders were neglected or unsuspected. Inquiry did not confirm the disinclination to seek advice noted at the Peckham Health Centre,[3] although the workers as a rule sought medical attention only for the alleviation of symptoms which were both unpleasant and disabling. Actually, 50% had seen their doctors during the preceding two years, and 22% between two and five years ago. Most of the major disorders found were symptomless, or had symptoms which did not interfere with the daily work. The minor disorders were usually quite obvious ; they were seen but not perceived. Bad teeth, as far as most of the subjects were aware, were quite natural and normal. Most of the major disorders would have benefited from medical care, if only as management. The minor disorders were largely avoidable and unnecessary; they could have been prevented, controlled or cured.

These findings demonstrate the value of routine medical inspection or health examination of adults, such as those already taken for granted in the school population. Once organised, regular health examinations would mark a major advance in public health.

I wish to thank Mr. W. T. Russell, F.S.S., for advice on the statistics.

DECONTAMINATION

THE accommodation available for dealing with gas contaminated casualties has recently been reviewed by the Ministry of Health, and a memorandum has been issued to all scheme-making authorities, with a plan illustrating a model cleansing unit to be attached to a first-aid post. Authorities are advised (Circular 2241, 1940) to review urgently the provision now made for decontamination. The centre should consist essentially of four compartments : an outside stripping-shed ; an inside undressing room ; a washing or shower room ; a dressing room. The object is to prevent the spread of gas vapour from the stripping-shed onwards. The four compartments should therefore be sealed off from one another and the doorways covered by wet blankets, and the floors should be impervious, preferably concrete. Each compartment should have cross ventilation, and the stripping room should be above ground level. The published plan illustrates a more effective arrangement of the gas cleansing section than had been previously proposed. Each compartment, of course, is duplicated so that the sexes are separated. In the stripping shed the contaminated person will leave outdoor clothing. The concrete floor should have a curb surround to prevent liquid flowing on to the surrounding ground, and the floor surface should fall towards a drainage outlet. A stand-pipe and hose should be provided for hosing down the floor and walls. The undressing room floor should also fall to a drainage outlet ; an eye douche will be provided here. In the cleansing room there should be a sunk space or tray under the showers with a fall towards a drainage outlet. Hot and cold water should run to a mixing valve and connections should be provided for two or more hand sprays and lengths of hose, in addition to showers. Eye douches are also to be available in this section. The dressing room is provided with cupboards for clothing and opens into the waiting room of the first-aid post by way of a corridor and two sets of doors.

Authorities are urged to improvise as far as possible to bring their existing posts into line with these minimum requirements, and to bear in mind that the cleansing section of a first-aid post might be used for the purpose of cleansing children. Proposals should be submitted to the senior regional officer, and the technical staff of the regional office will be ready to confer with local authorities and give them what help they can. Concentrations of gas may occur near first-aid posts, so that blankets should be fixed over all outer doorways unless other suitable measures have been taken. Copies of the circular have also been sent to the county medical officers and medical officers of health.

3. Biologists in Search of Material, London, 1938.

SCOTLAND

GLASGOW ROYAL INFIRMARY

AT the annual meeting of the managers of the Glasgow Royal Infirmary with the nursing staff, the chairman, Mr. Charles Glen, denied that urgent cases had been refused admission because of shortage of beds. When war broke out they were instructed to hold 400 beds vacant for air-raid casualties. Under such conditions they could not fulfil their duty to the civilian public, and they immediately made arrangements to convert their auxiliary hospital at Canniesburn and the Schaw convalescent home into hospitals, and with the help of Lenzie convalescent home made up the entire number of beds required by the Department of Health. Speaking also for the Western and Victoria Infirmaries, he said that in no instance had any urgent case been refused admission. They would always have waiting lists but in their hospital the list was turned over frequently during the year. If there were cases who had to wait longer than their medical advisers considered right he would be glad if these doctors would communicate directly with him so that full investigation might be made. The publicity about waiting lists had already had repercussions. In at least one instance a serious reduction of contributions from employees had been made under the misapprehension that, as casualty beds were being kept vacant, ordinary civilian patients were being neglected. The voluntary hospitals existed by the sympathy and generosity of the public, and while they welcomed the arrangement made with the Department of Health that waiting lists should be reduced they were not prepared to admit that they had neglected their duty to the public in any way.

GYNÆCOLOGICAL SERVICE IN INVERNESS

Representation has been made to the Royal Northern Infirmary, Inverness, that there is a fully qualified gynæcologist at present serving as obstetric surgeon to the local authorities of the northern counties and the burgh of Inverness, and urging the infirmary to assign beds for gynæcological cases and appoint Dr. T. N. MacGregor to take charge of them. Dr. E. K. Mackenzie of Tain, who moved the motion at a recent meeting of the Ross and Cromarty insurance committee, said he had resigned his directorship of the infirmary because of the objection to his advice that beds be apportioned to gynæcological cases, and because it gave him more freedom to agitate against a policy which was contrary to all modern practice. Every other district in Great Britain had taken full advantage of modern methods of treating women's diseases but the directorate and staff of the Northern Infirmary alone refused these to the women of the northern highlands. Many doctors had felt for years the absence of a qualified gynæcologist in that area. Women who could little afford it had to be sent to southern towns for treatment. This lack had been brought to the notice of the Department of Health and a fully qualified obstetrician and gynæcologist had been appointed by them, but he had no place at the infirmary although he had been welcomed by doctors and hospitals from Lochaber to Caithness.

IRELAND

MORTALITY AND MORBIDITY

THE annual report of the Department of Local Government and Public Health for the year ended March 31, 1939, shows that there has been a decline (from 542 to 487) in the number of deaths from the principal infectious diseases as a whole, but an increase in the number of deaths from diphtheria (from 293 to 314). The number of cases of typhoid notified fell from 413 to 254, with 46 deaths. Deaths from tuberculosis fell from 3639 to 3216, representing a mortality of 1·09 per 1000 of the population, the lowest rate yet recorded. Infant mortality declined from 74 to 67 per 1000 births, the rates being highest in the cities of Dublin and Waterford, and lowest in co. Leitrim. The report states that there has been better progress in reducing infant mortality in Dublin, where in a number of bad housing areas the toll on infant life is very heavy. The maternal mortality-rate per 1000 births was 4·1,

compared with 3·6 in 1937–38, and 4·7 in 1936–37. The deaths from puerperal sepsis were at the rate of 0·8 per 1000 births, compared with 0·9 in the previous year. In Dublin city the rate was 0·6, and there were no deaths from this cause in the cities of Cork and Limerick, or in nine counties. The number of children examined under the school medical inspection schemes increased by 6308 to 130,564. Dental defects were found in 43% of those examined, eye defects in 13%, and throat or nasopharyngeal defects in 19%.

SERUM SUPPLIES

For several years past—even before a European war was imminent—individual members of the medical profession had pointed out the risk to Ireland entailed by the fact that all supplies of therapeutic serums are imported, and at various times suggestions were made for the establishment of a laboratory or laboratories for the manufacture of such essential substances. Nothing was done, however, although the dangers were greatly increased when war broke out. In the past supplies were readily obtained from England and America, but the latter source is now closed or nearly so. Up to the present it is understood that adequate supplies from England have been available, but if there should be interferences with transport between the two countries, or if the supply in England should be so diminished as to render export unpermissible, Ireland, on the exhaustion of existing stores, might have an appalling death-rate. In a letter to the press Mr. Sean Milroy, a former senator and a member of Dublin corporation, urges that the manufacture of therapeutic serums in Ireland should be undertaken without delay. He recalls that when the plans of a new fever hospital for Dublin were under consideration a few years ago it was proposed to include a research laboratory, but the Department of Local Government and Public Health objected and the laboratory had to be deleted from the plans. Mr. Milroy has done a public service in calling attention to this urgent question.

MEDICINE AND THE LAW

Alleged Adulteration of Milk: the Burden of Proof

We may respectfully applaud the dictum of the Lord Chief Justice in James *v.* O'Neill that it is very important that prosecutions for the alleged adulteration of milk should not be loosely decided. This was a case where a milk sample, purchased in the street by a food and drugs inspector, was found to be deficient in non-fatty solids and to contain not less than 7% of added water. How had the alleged adulteration occurred? O'Neill employed a man named Davies to milk ten cows at his farm. After milking each cow, Davies carried the pail to the dairy and poured it into a churn. Both pail and churn were previously dry. While he was milking the rest of the cows, the milk already in the churn was not under observation, but a dog kept outside the dairy would have barked if anyone came near. When all ten cows had been milked, an air-tight lid was put on the churn and it was loaded into O'Neill's van, driven to his premises at Penarth, and delivered to his employee named Sadler, from whom the inspector bought the defective sample. Sadler bottled it in an adjacent dairy; the bottles were previously dry; they were put into crates and left in the dairy. O'Neill was the last person to leave the dairy in Penarth at 6 p.m.: he was there from time to time between 6 p.m. and 8 p.m. It was not under observation between 8 p.m. and 7 a.m. next day; the door was not locked; someone might have entered it by climbing a 6-foot wall. There was no evidence of the climbing of the wall, and the caps of the bottles were intact. When Sadler took the bottles to deliver to customers he found them just as he had left them. He himself delivered the milk from the van; he might have left the van unattended for half a minute each time he delivered the milk. But, on the whole, O'Neill was thus able to give a satisfactory history of non-interference with the milk. He suggested that the added water might be explained by the condensation resulting when warm milk was poured into an unheated churn which was closed soon afterwards with an air-tight lid.

The decision of Bowen *v.* Jones (1917) establishes that, if a defendant pleads that the milk when sold was in the condition in which it left the cow, his evidence must cover the whole time from milking to sale. There must be no gap. The Glamorgan justices, bearing that decision in mind, dismissed the information. The police appealed on the ground that O'Neill had not discharged the burden of proof because there had been periods when the milk was not under observation. The Lord Chief Justice, giving the judgment of the High Court, said that, if the justices had convicted O'Neill, no one could have argued that there was no evidence to justify the conviction. But they had found as a fact that the milk when sold was the same as when drawn from the cow. The police contended that there was a gap between 8 p.m. and 7 a.m. As, however, the caps of the bottles had been declared to be in the same condition at the end of that period as at the beginning, it could not be said that the justices had no evidence on which to dismiss the charge. The appeal was therefore dismissed.

There has been some judicial uncertainty about the defence that the milk is sold in the same state as it came from the cow. In Smithies *v.* Bridge (1902) there was a deficiency in fat because the cow had not been milked for several hours, although it was sold in the same state as when drawn from the cow. In holding that this milk was "not of the nature, substance and quality demanded," Lord Alverstone criticised the old decision in Lane *v.* Collins (1884) where a purchaser asked for "milk" and was supplied with skimmed milk with a 60% deficiency in fat. The decision in Smithies *v.* Bridge was criticised in turn in Hunt *v.* Richardson (1916) where the deficiency in fat was due to the cows feeding on wet grass and maize. It seems to be now well established that if the milk is shown to be the same at sale as at milking it satisfies section 3 of the Food and Drugs Act by being of the nature, substance and quality demanded by the purchaser. The further tightening of the law must depend on the public insistence on a high standard and on overcoming the natural opposition of agricultural interests.

Medical Evidence of Insanity

Medical superintendents of mental hospitals have probably noted the announcement last month by the President of the Divorce Court that it is now possible for them to give evidence of the state of mind of a respondent spouse in matrimonial proceedings by affidavit. The president has explained that this concession applies only to those cases where the medical witness can definitely express, with reasons, his unqualified belief in the patient's incurable unsoundness of mind and in the continuance of "care and treatment" for the prescribed statutory period. Medical superintendents, he observed, should also thus deal in appropriate cases with any question of extra comforts for the patient or any other matter relevant to the issue. He emphasised that witnesses must bear in mind the essential difference between incurability and mere unlikelihood or improbability of recovery. Any statement like "It is my belief that the respondent is unlikely to recover" is not enough to bring the case within the concession; it is not the expression of an unqualified belief in the patient's incurable unsoundness of mind.

This welcome innovation of practice will undoubtedly save the time of busy practitioners and diminish the cost of petitions.

Hospital Employment and the Truck Acts

In Cameron *v.* Royal London Ophthalmic Hospital a stoker complained under the Truck Acts of the deduction from his wages for laundry and lodging. The 1831 Act expressly excludes its application to domestic servants and the courts have been able to take a liberal view of what service is domestic. Lord Justice du Parcq dismissed Cameron's claim for repayment of the deductions. He was a mechanic employed to do odd jobs requiring skill, but most of his work was routine work. He was somewhat in the position of a chauffeur. Boarding schools, residential colleges and universities could be "domestic establishments." So also a hospital could be a *domus*; some kinds of hospital are commonly referred to as homes.

Public Health

CONTROL OF THE BED BUG

By J. R. Busvine, Ph.D., B.Sc. Lond.
RESEARCH WORKER IN THE DEPARTMENT OF ENTOMOLOGY, LONDON SCHOOL OF HYGIENE AND TROPICAL MEDICINE

Under present conditions people's standards of hygiene are bound to suffer, and one result is likely to be a spread of bed bugs. This unpleasant pest has only to be carried in the bedding of a few people to the large shelters to establish itself.

The extermination of bugs is greatly affected by circumstances. If infested furniture is being moved to a new house it can easily be disinfested by fumigation in a specially constructed van, and this is the method adopted by certain borough medical authorities in their slum-clearance schemes. On the other hand, there are villagers in backward countries who obtain relief by trapping bugs in paper or leaves and subsequently burning them (e.g. in the Balkans; Bogdandy 1927). Between these two extremes, conditions favouring the exterminator vary and will determine the appropriate measures to be used. I intend to describe the most effective methods first and proceed to others which, for various reasons, are sometimes more practical, and shall mention some promising new lines of attack.

FUMIGANTS

Insecticidal gases or vapours have the advantage of thorough penetration and are the only insecticides which will ensure immediate destruction of bugs and eggs hidden in inaccessible crevices. Their limitation lies in the fact that the structure to be fumigated must be reasonably gas-tight. One cannot guarantee success with any structure less substantial than an ordinary dwelling-house because it is impossible to maintain a concentration of gas for any length of time even in a well-built house. The vapour is lost by absorption and leakage so that a few hours after evolution of the gas the concentration in the free space falls below 50% of its initial value; and unless a high concentration of gas is maintained in the free space the gas will not penetrate sufficiently into the crevices where the bugs live. For these reasons the dosage of gas which has to be used in a practical fumigation may be 10 or 20 times the dose which is found lethal to the bugs in the laboratory.

It is often impossible to be sure of exposing all the bug population to an overwhelming dose of fumigant, so that it is essential to know at which stages in its life-cycle the bug is most resistant. The resistant stages are not the same for every fumigant; the eggs, for example, are relatively susceptible to hydrogen cyanide and ethylene oxide, but they are much more resistant than other stages to sulphur dioxide, chlorpicrin, trichlorethylene or chloroform. Resistance seems to be less capricious in other stages of the life-history; usually resistance increases throughout development and shows a slight decline in the adults. The state of metabolism also affects the resistance of bugs to fumigants; under warm conditions they are far more susceptible than under cold. Starvation augments their resistance to ethylene oxide and sulphur dioxide (Busvine 1938, Gough 1939).

Questions other than toxicity to the bug must be considered in comparing various fumigants; among these are danger to man (acute or chronic intoxication), fire risk, cost, damage to fabric or metals and the margin between the lethal concentration and saturation. The health hazard is pre-eminently important because of the close association of the parasite with man. The fumigants most frequently used in this country for destroying bugs can be expected to remain relatively cheap and easily obtainable during the war; they are hydrogen cyanide, sulphur dioxide, coal-tar solvent naphtha and orthodichlorbenzene.

Hydrogen cyanide is the most efficient fumigant for bed bugs, its only drawbacks being lack of pronounced smell and great toxicity to man. At ordinary room temperature (say 65° F. or 19° C.) the most resistant bugs succumb to a concentration of 1 mg. of hydrogen cyanide per litre, maintained for six hours. The dosage necessary in practice varies from 12–24 oz. per 1000 cu. ft.[1] with an exposure of at least six hours. Page and his colleagues (1939) made a study of gas concentrations during a house fumigation and based a series of recommendations on their results. Like other fumigants hydrogen cyanide is retained by absorbent materials and subsequently given off into the air. For this reason at least twenty-four hours' airing is necessary before a house may be safely reinhabited. It is very dangerous to fumigate clothes or bedding, and precautions must be taken even with cushions and upholstered furniture.

Sulphur dioxide is cheap, and owing to its strong smell is free from hazard because no-one would tolerate a dangerous concentration for long. It has been used for many years against bed bugs, but there are conflicting opinions about its effectiveness and the proper dose to use. Recommendations of from 1–7 lb. of sulphur per 1000 cu. ft. have been made without determining the concentrations produced in houses by these rates. Hughes (1934), who advocates a heavy dose, considers that about 10–20% of sulphur fumigations are unsuccessful. A recent laboratory study by Gough (1939) has established which stages are most liable to survive. The eggs immediately after being laid are 2–3 times as resistant as the nymphs and adults. Starvation appears to increase resistance of bugs at other stages though they do not surpass the eggs. In my opinion fumigation for at least six hours with 3 lb. sulphur per 1000 cu. ft. can be relied on to kill the active stages of the bug, but a few eggs may escape. If sufficient survive to maintain the infestation fumigation should be repeated before they become adults and produce eggs again (i.e. within the next six weeks). In sulphur fumigation it is important to ensure complete combustion. A good brand of sulphur candle containing an oxidising agent will give the best results. Gunn (1933) recommends the use of sulphur dioxide cylinders with a dose of 90–120 oz. per 1000 cu. ft. But the gas released from cylinders is not distributed so well as that from burning sulphur which is circulated by convection currents. Being more than twice as heavy as air the sulphur dioxide forms a layer at the bottom of the room and fails as a fumigant unless some heating or stirring device is employed.

Coal-tar heavy solvent naphtha is cheap and claimed to be very efficient (Glover 1939). In use, however, it demands a rather elaborate procedure. Since the toxic concentration is very near the saturation value the house must be warmed to keep it above 60° F. and the material is sprayed on to screens to facilitate evaporation. As there is some risk of fire all lamps used for warming must be removed. Repeated exposure to the fumes may cause lesions in the human liver (Taylor 1939). Heavy naphtha has been used for a considerable time by some medical authorities without unpleasant results, but it is a mixture of substances which varies in composition, and it is not certain which ingredient is dangerous to man.

LIQUID INSECTICIDES

Bugs live in crevices by day which makes it difficult to use liquid insecticides against them. Even if cracks and corners are carefully sprayed large numbers will escape direct contact. Recent investigations have shown, however, that oil-borne insecticides atomised into a mist settle to form films which are toxic to insects walking over them (Potter 1938). These films remain active for several weeks and their use has been suggested against bed bugs.

The compound most thoroughly tested for use against bugs is *n*-butyl carbitol thiocyanate (*β*-butoxy *β*'-thiocyano diethyl ether). This is a synthetic thiocyanate produced by an American manufacturer and marketed as a 50% mixture with a high-boiling kerosene ("Lethane 384"). A film of oil containing 0·75 mg. per sq. in. of this thiocyanate was found to retain its toxicity for at least nine days (Potter and Musgrave 1940). Lower doses were liable to lose their effectiveness in this period.

A number of oil-soluble insecticides were tested as direct sprays to cimex eggs by Callaway and Musgrave (1940). In descending order of toxicity they were:—

1. 3% *n*-carbitol thiocyanate (6% lethane).
2. 3% *α*-naphthyl isothiocyanate.
3. 0·4% pyrethrins.
4. 3% lauryl rhodanate.

1. 1 oz. per 1000 cu. ft. equals almost exactly 1 mg. per litre.

Some tests with the saturated vapour of lethane showed that it has considerable toxicity and will kill 100% of the eggs in a few hours at room temperature. The vapours of lauryl rhodanate and pyrethrum extract had no effect under these conditions. A word of caution with regard to α-naphthyl isothiocyanate must be given. This substance provokes dermatitis, and this precludes its use on surfaces likely to be touched by man (Schwartz and Warren 1939).

Taking all the laboratory data into consideration it is clear that of all these substances lethane possesses the greatest initial toxic effect to bugs; it is not known which is the most persistent. Possibly the relative volatility which makes the vapour of lethane so toxic may reduce the time during which it persists.

Two different types of oil carrier are commonly used and there seems to be no information as to their effect on the initial toxicity and lasting power of the insecticides. The oils concerned are: "odourless distillate," a kerosene-type oil, boiling about 200–270° C.; and Shell oil 24210, similar to medicinal paraffin, with an initial boiling-point of 325° C. Both are highly refined and colourless. Some preliminary experiments on the use of oil-film insecticides against bugs on a practical scale have been made in infested houses (Musgrave 1940); lethane 384 in four different oil carriers, a pyrethrum preparation and a mixture of the two were used. About a gallon of 3% thiocyanate was used in spraying a small 4-roomed house. It is difficult to judge from the results which was most efficient, but the generally high kill obtained justifies further development of this type of insecticide.

POWDERS

The long distance travelled by bugs and their erratic habits make it difficult to ensure that they will come into contact with insecticidal powders. Since the insect only feeds on blood the possibility of poison baits is ruled out. For these reasons little attention has been paid to powder insecticides for bugs. In experiments carried out more than twenty years ago pyrethrum was found to be one of the few effective powders (Blacklock 1912, Castellani and Jackson 1915, Scott et al. 1918). General experience, however, shows that it must be used fresh or oxidation will lower the toxicity. Some of the materials found to be ineffective in this early work were sulphur, tobacco powder (containing over 5% nicotine), quassia, hellebore and various inorganic salts (calomel, borax, &c.). There is a brief reference to the use of derris against bugs by de Bussy and his colleagues (1935), and that is unfavourable.

If the use of powder insecticides for bugs is contemplated today further laboratory tests are necessary to compare the best preparations for speed of kill and persistence. My colleague Mr. H. S. Leeson allows me to report results of causing bed bugs to walk on cloth powdered with insecticidal powders known as AL. 16 and 63.[2] The dose of powder was 0·1 g. on 40 sq. cm., in an open vessel with vertical sides, to prevent escape of bugs. At 32° C. both powders kill all bugs, whether nymphs or adults, in from three to ten days. In a room in which the temperature fluctuated from 17°–24° C. all were killed in from five to twenty-five days. At a still lower temperature, 8°–15° C., some adults survived apparently unhurt for at least three weeks, but nymphs always died whenever they happened to moult. The two powders seem to differ little in effectiveness, but experiments show that AL. 16 retains its power of killing bugs after at least a week's exposure to air. It could not be claimed that these powders are quickly effective, but under certain circumstances they might prove useful.

TRAPPING AND HEAT

It has been suggested that intermittent trapping is an indifferent palliative only worthy of primitive societies. The idea has been applied to modern life, however, in the form of a permanent trap described by Kemper (1931) and Mossop (1940). This consists of a metal check-band let into the wall of the building liable to infestation and contains some form of trap or harbourage which can be disinfested from time to time. According to Mossop's account this method requires elimination of natural harbourages below the band and periodic disinfestation of the trap harbourage, if it is to be successful.

Bugs are readily destroyed by heat; the adults die within an hour at 44° C., while the eggs require 1° C. higher (Mellanby 1935). It would therefore appear a simple matter to disinfest houses by superheating as, indeed, was recommended in Canada and the United States twenty-five years ago. Unfortunately it is surprisingly difficult to ensure penetration of the lethal heat into the crevices where the bugs hide, especially those near the floor. The treatment has to be very long for this reason (one day at 60°–70° C. or two days at 50° C.) and cannot be recommended where other measures are available. A blow-lamp can sometimes be used for local heat treatment; of iron bed-frames, for example. Kemper (1929) has described a hand instrument which projects steam superheated electrically to 300° C. This is claimed to deal efficiently with cracks and crevices, and polished or glued articles are said not to be injured.

2. The formulæ cannot be disclosed at the moment but the powders are available commercially. The material is not harmful to man.

REFERENCES

Blacklock, B. (1912) *Ann. trop. Med. Parasit.* **6**, 415.
Bogdandy, St. v. (1927) *Naturwissenschafter*, **15**, 474.
de Bussey, L. P. Van der Laan, P. A. and Jacobi, E. F. (1935) abstract in *Rev. appl. Ent.* (B) **23**, 145.
Busvine, J. R. (1938) *Ann. appl. Biol.* **25**, 605.
Callaway, S. and Musgrave, A. J. (1940) *Ibid*, **27**, 252.
Castellani, A. and Jackson, T. W. (1915) *J. trop. med. Hyg.* **18**, 253.
Glover, B. J. T. (1939) *J. R. sanit. Inst.* **59**, 671.
Gunn, W. C. (1933) *Publ. Dep. Hlth Scot.* No. 2.
Hughes, A. W. M. (1934) *Med. Offr.* **52**, 203.
Kemper, H. (1929) *Z. Desinfekt.* **21**, 285.
— (1931) *Ibid*, **22**, 406.
Mellanby, K. (1935) *Parasitology*, **27**, 111.
Mossop, M. C. (1940) *Rhod. agric. J.* **37**, 109 and 162.
Musgrave, A. J. (1940) *J. Hyg., Camb.* **40**, 462.
Potter, C. (1938) *Ann. appl. Biol.* **25**, 836.
— and Musgrave, A. J. (1940) *Ibid*, **27**, 110.
Schwartz, L. and Warren, L. A. (1939) *Publ. Hlth Rep., Wash.* **54**, 1426.
Scott, E. W., Abbott, W. S. and Dudley, J. E. (1918) *Bull. U.S. Dep. Agric.* No. 707.
Taylor, H. (1939) *Chem. Ind. Rev.* **58**, 1078.

Points from the Annual Reports

STAFFORD

Dr. H. B. Binks, in his report for the small borough of Stafford (acreage 5089; population 32,670) reviews 1939 with regret "inasmuch as schemes, including the new welfare centre, have been curtailed and much needed progress, especially as to the housing needs of the borough, retarded." The new welfare centre is needed badly, for in 1939 the birth-rate was the highest for twelve years and the infantile mortality 69 per 1000 live births, the highest for fifteen years. The existing centre is insufficient to carry its increasing load. As regards housing, "the eleven clearance areas reported last year were not confirmed by the Ministry owing to the war"; this adequately explains the position. 1939 was a hard year for all local authorities, but the smaller boroughs suffered most from curtailment or postponement of necessary structural work. Diphtheria was high in incidence but low in fatality, for in 143 notified cases there were only 4 deaths. We are told that the prevailing organism was of the gravis type. During the year 37 children who had been immunised were notified as diphtheria, of whom 36 had positive swabs. Dr. Binks tells us that none of these children died, but does not say how many of them had clinical diphtheria. Immunisation has no effect upon infection, and in times of epidemic, when swabbing is done freely, notification may be made on bacteriological findings. We do not know if this was so in Stafford, but the history of the visitation given by Dr. Binks suggests that it might have been so in the latter stages of the epidemic.

PARTS OF HOLLAND

The Parts of Holland, which is an administrative county within the geographical county of Lincolnshire, is larger than is generally supposed and more populous, for it contains 267,854 acres and 95,560 inhabitants. It is mainly agricultural, the chief industries being fruit and vegetable canning and beet sugar. The county is increasing its population, and should have a prosperous future. In the first days of the war Holland was a reception area. Dr. W. G. Booth has much to say

about the evacuation, the most interesting part of which is the great improvement in the general physique of the received children who settled down. Of the mothers with children only 26·4% remained on Oct. 5, 1939, but of the unaccompanied children 91% remained. There is considerable hope that a proportion of those evacuated from the cities into rural districts may remain there permanently, or return to rural life when the country settles down after the war. This is most likely to happen in counties like Holland and other parts of East Anglia where fruit and vegetable culture and canning are developing into important industries. The detection, supervision and training of mentally defectives is well organised in Holland, which is allowed a quota of 114 beds in the institutions belonging to the Lincolnshire Joint Board. At present there are 142 mentally defectives under statutory supervision and the number on the register is 304, or 3·2 per 1000 population. A high proportion of mentally defectives more often means a high mentality of those who deal with them than a low mentality of the population. Dealing with breast-feeding, Dr. Booth mentions the difficulty of mothers employed on the land continuing to feed their babies. This is an important point.

NOTTINGHAM

Dr. Cyril Banks reports that the maternal mortality of the city of Nottingham sank to the low record of 1·32 per 1000 births live and still. Nottingham has had a low maternal mortality-rate consistently for many years, but its infantile mortality, 66 in 1939 which is the lowest ever recorded, has not been particularly good. The home midwifery is now almost entirely in the hands of the municipal midwives. Whatever faults may be found with the English system of midwifery, where it has been well administered it has succeeded in reducing maternal deaths further than anybody believed possible. The most important event in Nottingham in 1939 was an outbreak of 34 cases of typhoid in a limited district of the city. All but 2 of the cases were infected on the same day. The cause of the outbreak was suspected within twenty-four hours and proved a few days later. We are told it was an infected food; that the cases were nearly all of great severity and 3 of them died. Beyond this we are told nothing. Dr. Banks says that it is not proposed to make any more detailed statement on the causation of the outbreak "as nothing new would thereby be contributed to medical knowledge." It is hard to see why, for if the disease was eberthella we know of no outbreak the cause of which was suspected in twenty-four hours and proved within a few days; and if it was one of the salmonella typhoids, the outbreak, though not unique, would nevertheless be worthy of record.

GLOUCESTERSHIRE

The county of Gloucestershire, of which Dr. H. Kenneth Cowan furnishes an abridged report for 1939, is wholly a reception area if the county borough of Gloucester is excluded. In the early days of the war, Bristol, which is geographically within Gloucestershire though the Bristolians repudiate it, was a neutral area, but being now one of the objectives of enemy action, it, with the part of the county immediately surrounding it, cannot be used for reception. The majority of the county is, however, well suited for reception in most respects, but in part of it the water supply and drainage are poor, so it is one of the reception areas that require close watching for water-borne disease. The population has always been unfavourably disposed to vaccination and consequently to inoculation of any kind, so Dr. Cowan will find it difficult to do much in the way of protection even in the face of actual epidemic situations. The population of the administrative county was 359,000 in mid-1939, a third being urban and two-thirds rural. What addition to it has been made by reception is not known, but it is considerable.

After heart disease, other circulatory diseases and cancer, the most frequent cause of death in 1939 was violence which killed 193 persons, or 4·12% of all who died. Violence beats pneumonia by 1 death and phthisis by 42. The infantile mortality was 43 for the whole county. For the second year the urban was lower than the rural rate. Until 1937 the rural rate was always below, and generally considerably below, the urban rate, but in 1938 the rates were: urban 39 and 39; rural 49 and 45. This reversal is important, for natural causes always favour rural districts. Child welfare has now overcome the killing effect of urbanisation.

From the School Reports

From Dr. Stuart Allison's report to the education committee of the county borough of *Warrington* we learn that the year's cost of the medical department was 8*s.* 8*d.* for each child, which represents 8*d.* in the £1 of the total cost of elementary education. In the school reports for Warrington we have noticed what appears to be a curious discrepancy in the incidence of unclean heads. Since 1936 the percentage of children found on routine inspection to have unclean heads has been below unity—in 1938 it was only 0·09%—though the standard expected is high. The surprise visits of nurses, however, reveal a state of affairs no different from that of other towns comparable with Warrington. Thus in 1939 the nurses made 28,910 head inspections at which 1481 children were found to have unclean heads and 96 were excluded from school on this account. The explanation of this must be either that the children are cleaned up for inspection, in which case the records show what can be done in this direction; or that the dirty children manage to avoid routine inspection. As the subject of verminous heads is much to the fore at present and hopes of exterminating the head louse at some future date have revived, Dr. Allison would do a public service if he would explore the matter.

Dr. Kenneth Fraser in his report to the education committee of *Cumberland*, which is a reception area, says that in 1939 it was not possible to keep the statistics for the native and received children separately, but this has been done for 1940. This separation is general in reception areas and is required for official purposes, but it may be questioned whether after the first four months of evacuation it will give value for time and trouble. We have learned much from the comparison of children received from the towns with the natives of county districts, but children react so rapidly to changes of environment that after four months the points of difference between those town and country bred will be largely eliminated. Dr. Fraser gives a valuable table of the states of nutrition of the school-children in the urban and rural districts of the county which has been prepared with exceptional care. The districts differ greatly in geographical, climatic and social amenities and the nutrition of the school-children varies considerably according to the districts. The lowest is in Ennerdale R.D., the highest in Wigton R.D., Maryport U.D., and Penrith U.D. The influence of geography on apparent nutrition is important and calls for exploration. According to Peacock: "The mountain sheep are sweeter, but the valley sheep are fatter." Whether this is also true of children we do not know, but there does seem to be differences between children reared by the sea, on elevated plateaus, and in valleys. The numbers of cases of skin diseases found by the school medical officers were:—1 ringworm of head; 37 ringworm of body; 209 scabies; 461 impetigo and 543 small septic sores. This would be amongst about 14,000 children and is a usual distribution today. Compared with former times, the almost complete elimination of head ringworm is remarkable, but scabies and impetigo have not yielded.

From Dr. C. B. Moss Blundel's very brief report to the education committee of *Huntingdonshire* we quote the following dental statistics, for they are typical of the present state of school dentistry in rural counties. Children dentally inspected 5263; found to require treatment 3336; actually treated 2123; permanent teeth filled 1112; permanent teeth extracted 2376.

Mr. A. E. Hall, senior dental officer for *Leyton*, gives some tables of the state of the teeth of children in the secondary schools (aged 11 to 18 years) which show that of children above the age at which compulsory education ceases nearly 95% need dental treatment. This suggests that even if we reached the happy stage of turning children out from school dentally fit we should not secure a dentally fit nation unless we made provision for the continuance of supervision at least to the end of adolescence.

In England Now

A Running Commentary by Peripatetic Correspondents

DURING those long night watches with the Home Guard one thing I relearnt—God forgive me that I could forget—was of the constant anxiety about money among my working-class comrades: "I reckon a pair of tyres is going to save twice their cost in boot leather in two years," "We couldn't live without the allotment, I daresay it's worth 4*s.* to 4*s.* 6*d.* a week to us," a hundred sentences like that and very little beside. Financial fear, financial alertness at any rate, forms the very fabric of their thought. That surely is the first thing to realise about fear, it has a vital function to perform, in this case to stimulate so that by scraping and economising ends shall be met.

During those vast temporal expanses of man's forming it was not so much fear of starvation that dominated man as the more direct threat against life itself, and any consideration of care or anxiety must take this as a starting point. I notice some people smirk when that state of man which lasted scores of thousands of years is mentioned. They remind me of a very newly rich person about three weeks in his grand new house: "True, I was a slum child, an inglorious errand boy, a pushing, not over-scrupulous young man, but the less said about it the better"; but that can't be the point of view of his biographer. Man's state must have been very like that of any wild creature now, say a partridge, constantly on the alert day and night, keeping away from the hedge until it is proved safe, using the wind as a messenger, and the kindly vibrating earth as a prophet of trouble. The whole fabric of man's thought was fear of enemies, and if it hadn't been he would have ceased to exist.

What was man's primary response to danger when it did come? Flight or fight, as some suggest? Nonsense. Slower than all winged and most four-footed animals, man isn't designed for flight; nor for fighting, he's naturally unarmed, and by the time he came to making armaments the need for a natural defence was beginning to be less imperative. No, man's primary response to the approach of danger was the most universal one in the animal kingdom today from the geometer caterpillar to the giraffe; it can be seen in any country walk, the rabbit uses it although he has underground shelter, the hare uses it in spite of his turn of speed, many birds use it in spite of their winged swiftness—a sudden crouching immobility, a statuesque stillness, which naturalists call "freezing." It is seen particularly in otherwise helpless creatures, cornered animals, young birds in the nest, the young leveret's and young plover's only protection, and it was even more effective before the earth's surface had been largely cleared of vegetation. It is seen in its most intense form in the rabbit paralysed with fright by the shouting harvesters, the man stunned by the dive bomber, and in its greatest artistry in the feigned death of the American opossum. It is an intrinsic part of native life, and of course the whole object of it is that immobility, often combined with protective coloration, gives safety.

* * *

What is this mechanism that makes a timid animal lie still while his enemy passes close by? How does Nature—a convenient word for the resultant of the trial-and-error method over thousands of years—how does Nature accomplish this contradictory task? By paralysing the sensorimotor nervous system, and playing on the autonomic. "I can't trust you with your new apparatus, it would give you away. We must fall back on your old vegetative system." Thus emotion, the one connecting link between the higher centres and the autonomic, in crescendo waves of fear, melts the fuses, leaving the higher centres curiously detached and interested, while the autonomic plays the part of protector, the dilated pupils blurring the vision, the patchy pallor blending with the shadows, the shallow breathing giving less movement, and so on. The nightmare in which some terror approaches and one is unable to move and yet is curiously interested is this ancient mechanism in dreams. But it has become a graduated mechanism, it doesn't often in modern times get to the stage of paralysis. When the danger is far away, or when the higher centres control the emotion so that it is less, then the ordinary alertness is merely increased, giving just enough stimulation to the thyroids to give increased awareness, just enough to the suprarenals to give an increase of blood-sugar in case it may be needed. If the danger is one that can be met by fighting, then after a period of suspense during which the autonomic gives a preparatory unloading of the viscera—examinees' diarrhœa and the polyurinating in the pavilion before a big match are modern examples—then the mechanism goes into reverse, fear changes to anything between anger and eagerness, depending on whether the opponent is, say, a wild pig or an examiner. But these are latter-day modifications; man's primary response to danger was "freezing," and this entailed a gradual decontrol of the voluntary nervous system and an opportunist playing on the autonomic.

* * *

Here then is your key to functional disease, with its faulty higher control, its disdain of segmental anatomy. Here among this haggard horde of worriers, kept continually in the early stages of this mechanism, are your recruits. Here is your key to those diseases that have a psychological background, peptic ulcer which cannot keep still to heal for the agitated smooth muscle beneath it, mucous colitis for the same reason, Graves's disease from continual stimulation of the thyroid, diabetes from the suprarenals, hyperpiesia, and so on. This is why it is the threat rather than the actuality of danger that causes functional disease; this is why the greater the self-control, the more discriminating the view of danger, the less will the autonomic be left to play its blind protective rôle; this is why functional disease is accompanied by lesser motor activity.

The word-thinker may find something incredible about this conception, but to the picture-thinker earlier man dissolving into the still shadows of the forest on the approach of a sabre-toothed tiger, and the stockbroker chucking his golf and raising his blood-pressure when markets slump, and the woman who taking to bed develops strange pains when her husband may love another, are all on the same film.

Is this the end of the story? Certainly not. The danger passes as it generally did, or it wouldn't be the most popular defence mechanism in the animal world today; the danger passes, the mechanism goes into reverse, the autonomic swings back to the relaxed side of normal, the sensorimotor system becomes more active than usual, there is a pæan from the higher centres, ranging in tone from relief to boastfulness, from "Well, we've survived that at any rate" to "You may have had bombs, but we had land-mines." This gives a sense of well-being, stimulates one's self-esteem, and makes the prospect of going through it again less dreadful, even entrancingly exciting. Fear has been consummated and—celebrated.

A nice bit of mechanism, but, one may note, not so intricate nor so ingenious as those which man had devised against his microscopic foes, the vast slave-labour system of the phagocytes, the opsonins, agglutinins, precipitins, the chemist's shop of antibodies, the furnace that can be lit to burn the invader out. From which we must deduce that man has had far the most trouble with his evolutionary inferiors in his upward rise.

There is a similarity between our freezing mechanism and the sexual mechanism, which I think must be derivative. Desire, consummation, satisfaction, one three-act play, compares with fear, freezing, exultation, another; those who dally and get no further than Act 1—the love-play hysterics or masturbating neurotics—compare with the shellshock cases that never heard a shell fired or the cancer-phobia neurasthenics, functional frustrates; Act 2, autonomic release, in both plays cannot be inhibited; while those who go on to Act 3 have a nice comfortable feeling that makes a repetition of the play pretty tolerable.

* * *

There are two tag ends from the papers that gave rise to this didactic little essay. Enuresis I don't think belongs here at all. It is of the running-back-to-mother group, which embraces failures to face life, ranging from shyness to schizophrenia. But asthma does. An asthmatic is a person who has difficulty in breaking down some foreign protein. During the early stages of freezing

—that is to say, during anxiety—more protein will leak through from the alimentary tract and he will be worse. The actual asthma is, I think, another derivative mechanism, designed to repel a respiratory invader. In days when digestions were trained in a Spartan school and food was much less varied leakage from the alimentary tract which wasn't immediately broken up in the blood-stream never occurred. Thus it is that the presence of foreign protein in the blood-stream is generally interpreted by the body as a tracheal invasion, which was very common. If anything really dreadful comes along the primary mechanism takes precedence, and the asthmatic will "freeze," fly or fight with the best of us. Afterwards he has to face his persisting foreign protein again. Didn't someone record three cases of urticaria after close bombing?

* * *

The reason why this simple conception of man's primary mechanism against external foes is not more obvious is because we have been rather taken with the idea of ourselves as Lords of Creation, and have forgotten that humble, hunted, ape-like opportunist from whom we sprang, even as I had forgotten the limiting quality of financial alertness that surrounded me during my impoverished and very happy childhood. C. G. L.

* * *

I was out of London for Christmas and did not get back until the following Monday morning. But to what a London! Guy's was ringed by smoking shells of buildings. Down Bros. was hardly a shell[1]—a few pillars only—and all the buildings along St. Thomas's Street and Maze Pond were the same. The Ship and Shovel, where Guy's men have resuscitated themselves for generations, was gone and the college was half burned out (some will say about time too). Bombs fell on the hospital, but surprisingly left it almost intact. The faces of the nurses and the residents reminded me of what the men looked like after the battle of Gaza in the last war, but we must be thankful that they got through alive. They got the nurses and the patients out to a safe place as soon as they could, but the nurses were back by 9.30 next morning. On the Monday I had quite a busy outpatients, and I had a fairly ordinary operating-day on the Friday. I have been the round of the City since, but I didn't see anything to compare with the immediate surroundings of the hospital.

* * *

A man in the train told me a story which I had not previously heard. The lady of the manor was entertaining a party of Czech airmen, and one of them happened to make some remark about his wife. "Have you any family, then?" said the lady. "Family? What is that?" "Have you any children?" "No, we have no children; it is a great grief to us—you see, my wife, she is unbearable." One of his fellow Czechs laughed heartily. "He do not know how to speak proper English," said this officer; "what he mean is that his wife is inconceivable." A third Czech laughingly joined the conversation. "No, no, what they mean, madam, is that his wife is impregnable."

* * *

The term "alterative" is perhaps now expunged from works on materia medica. It used to be classed under "drugs acting on metabolism." It must have been useful to the perplexed doctor. A patient would doubtless be all for alteration of his condition. The modern sick, they tell me, are much more sophisticated, but they might succumb if told that their metabolism required readjusting, and if a not-too-simple explanation of that mysterious process was afforded. The term "tonic" I find in my old edition of a well-known work on materia medica is only used justifiably when applied to a drug which increases muscular tone. This is brutally frank and severely limits justification for the still widespread use of tonics. Recent editions may exhibit more savoir-faire. Otherwise it would be just too bad, when we have to live—whether our patients are on the panel or on their own.

1. Messrs. DOWN BROS. ask that for the present all correspondence should be addressed to Tabard Works, Tabard Street, S.E.1. Visitors will be welcome at their showroom at 22a, Cavendish Square.

Letters to the Editor

TYPHOID CARRIERS

SIR,—In view of the present heavy aerial attacks on our cities with their possibility of damage to the water mains and sewers, the risk of epidemics of enteric fever is ever present. This is recognised by the Ministry of Health in their offer of free inoculation with T.A.B. vaccine to all who desire it. It is widely recognised that the prevalence of enteric fever in endemic form is due to the persistence of chronic carriers, the detection and control of which would go far towards eliminating the disease in any given area. But this is a formidable undertaking especially under the stress of war, even if a preliminary Widal, commencing with a low dilution (1/10), be performed before the dejecta of suspects are examined for *Bacterium typhosum* and *Bact. paratyphosum* B (the only relevant organisms in this country) as is advocated for instance by Kristensen and Henningsen (*Z. Hyg. Infectkr.* 1936, **121**, 129), and by Topley and Wilson (Textbook of Bacteriology, London, 1936, p. 1221). The former, working in Denmark, found that 20% of the sera of 7000 persons examined gave a positive agglutination reaction to one or other of the organisms. Thus in 80% of cases it would be unnecessary to conduct any further examination. But not all chronic carriers possess demonstrable agglutinins even at this low dilution and mild ambulatory cases excreting the organism or incipient cases would tend to be mixed.

It is perhaps not so widely realised that the contacts of cases of enteric fever may excrete the organism for a time at least, and while doing so are a source of danger to the community. In dealing with the relatively small numbers involved as contacts it is possible to examine the urine and fæces directly without the preliminary Widal, the results of which at best are equivocal. At Prof. H. D. Wright's suggestion such a search for carriers has been made among 32 contacts of the 6 cases of paratyphoid B fever which have occurred in Liverpool since September last, with the surprising result that 6 fæcal carriers were found (one also was a urinary carrier). In 3 the condition cleared up rapidly; the fæces became negative in three weeks and have remained so since. The other 3 cases are still excreting *Bact. paratyphosum* B. In no instance were any symptoms complained of. It is perhaps noteworthy that all occurred among the members of two large families (7 in each) living under rather crowded conditions, and in both the mother was involved. While it is too soon, and the numbers examined are too small, to make any deductions it appears both feasible and profitable to search thus for carriers among enteric-fever contacts as a means of further controlling the spread of the disease.

It is necessary to use a technique capable of isolating *Bact. typhosum* and *Bact. paratyphosum* B even if present in comparatively small numbers in the fæces or urine. This can be assured by preliminary enrichment of the specimen by culture in Schäfer's modification of Muller's tetrathionate broth (*Zbl. Bakt.* 1934–35, **133**, 458) which discourages the growth of most of the bacteria in urine or fæces except *Bact. typhosum* and *Bact. paratyphosum* B, with subsequent plating on brilliant-green eosin agar (Jones, *J. Path. Bact.* 1936, **42**, 455) or on Wilson and Blair's medium as modified by Tabet (*J. Path. Bact.* 1938, **46**, 181). MacConkey plates may be used, but are not recommended because some of the pale colonies consist of such organisms as late lactose fermenters or Morgan's bacilli which are apt to come through the tetrathionate broth as at present constituted. This complication does not arise if either of the two previously mentioned types of plate is used.

There is one practical matter to be observed in the collection of fæcal specimens. To obviate any gross infection among specimens collected in the home by their being received into the same receptacle with possible inadequate sterilisation between times, suspects were asked to defæcate directly into waxed cardboard cartons about 3½ in. in internal diameter and 4 in. high, which were obtained from Mono Containers, Park Royal, London, N.W.10.

Heswall, Cheshire. A. C. T. VAUGHAN.

FAMILY ALLOWANCES

SIR,—My committee learns with gratification that the Government intends, at an early date, to introduce a system of family allowances. This society has long been pointing out that the task of citizen-building has been carried on by the nation's mothers in the majority of homes with a dearth of the necessary materials, but beyond that the housewife performs a great variety of tasks, each of which can command a fair livelihood, and as is so rightly pointed out in your Aylesbury Broadside, all these tasks are done without any remuneration. The housewife has nothing which is her very own. Any personal expenditure into which she may enter may be the cause of prosecution by her husband if he disapproves. Recent cases have illustrated this. In your pamphlet a diagram is given illustrating the proportions spent on various items in a sample budget. There is an item, the husband's pocket money, illustrated by a drawing of a man enjoying a smoke, but there is no item, the wife's pocket money, nor is she depicted indulging in any personal gratification.

It is often contended that citizens are of a low mental and physical standard because the housewives are unskilled at their tasks. I do not concur in this view, having been amazed at what is achieved in homes below the poverty line against tremendous odds. If it were so, however, it could not be a matter for wonder, for in what trade can skilled workers be obtained for bare board and lodging as recompense?

The mother, before and after the birth of her child, must have increased nourishment, beyond the needs of an ordinary adult. Not only does many a mother lack this extra nourishment but she also goes short, as the reports on malnutrition show. No scheme will bring about the hoped for improvement in national physique which merely allows a few shillings per week per child. An allowance for the nutriment of the mother must also be provided and some little personal spending allowance as a recognition of her labour.

Recognising that a service has been rendered to the community by the work done on this subject by THE LANCET, I venture to ask that speedy attention will be given to this weak point in your scheme and in the other schemes which are before the public.

DOROTHY E. EVANS,
Chairman, The Six Point Group.

London, N.6.

DIPHTHERIA PROPHYLAXIS

SIR,—Just as it has needed one of the lesser powers, Greece, to prick the inflated bubble of Axis invulnerability, so it has fallen to the lot of little Aberdeen to show the way to a practical application of active immunisation against diphtheria.

For many years now, as a result of the efforts of research workers in various localities, the complete answer as regards diphtheria prophylaxis has been made available to mankind. That this is no exaggeration has been conclusively demonstrated in several small towns, notably in Canada, where as a result of its proper application diphtheria has completely disappeared. In fact its value is no longer a question of opinion but an established fact. Even the most rabid of the antis, whose skill at misrepresenting facts and twisting figures to support their crazy views fills me with admiration, appear to be loth to join issue on this point. In spite of all this between 3000 and 5000 children die annually from diphtheria in this country alone. The return of cases for England and Wales for the week ending Nov. 23, 1940, is 1366.

Why must this state of affairs go on? What or whose is the fault? Some recommend compulsory immunisation. The answer to this is definitely NO. You cannot compel British people to submit their bodies to an operative procedure about which they know nothing—what are we fighting for? Some suggest education; undoubtedly a very valuable link in the chain, but still fails to achieve the desired end. No, it has been left to little Aberdeen to supply the obvious missing link. To quote your special article of Dec. 28, "The success of immunisation in Aberdeenshire is due mainly to the fact that a medical officer is assigned to this work only. He has the responsibility of undertaking propaganda, performing immunisation and entering up the records. . . . The appointment of full-time officers is of primary importance."

Time has shown that it is not enough to supply free antigen, freely applied by the doctors who for the most part have proved themselves only too anxious to coöperate, to a public which has been more or less circularised by the local and school authorities. In fact it is quite impossible to put the blame for the comparative failure of diphtheria immunisation on any special individual or group in the chain. The cause of the failure and its remedy has been supplied by Aberdeen—there must be someone to organise and weld all the links of the chain together and supply the necessary stimulus to make it really effective.

Now, Mr. Malcolm MacDonald, you who have already proved yours lf a really live wire in the Ministry you control, you have a great opportunity. You can go down to history as the Minister of Health who eradicated diphtheria from the British Isles. I must not presume to teach you principles of organisation, but as I see it, broadly speaking the essential point is the appointment of a commander-in-chief prophylactic immunisation, preferably a medical man in complete touch with all details of the technical side, with powers to appoint assistant medical officers in all the larger districts who should work through the already existing public-health organisations. And, above all, let it not be forgotten that they are all full-time officers engaged on this work and this work only. Once having established this system its scope can easily be widened to cover other infective diseases, especially tetanus, the typhoid group and smallpox. The cost of the whole business would eventually be more than covered by the saving of public funds in treatment.

J. DUDLEY BENJAFIELD.

HAZLITT ON DYING

SIR,—Dr. Crawford's quotation from William Hazlitt gives us a distant reflection of the ideas and epigrams on dying current in the ancient Greek and Roman world, including especially those of the *inveni portum* class. (Cf. my Aspects of Death, London, 1922, fourth edition, pp. 26, 27, 182, 545.) The Greek and Roman ideas on death, as on love, expressed with countless variations in prose, poetry and the designs on engraved gems, etc., trickled out over the whole civilised world, and, though suppressed by mediæval Christianity, broke all bounds during the European classical revival, and constituted part of the common intellectual atmosphere of Shakespeare and the great lights of the English renaissance.

Naturally it is often very difficult to trace epigrammatic poems, etc., to their source. Thus, on a sepulchral monument (1628) in Cuckfield Church, Sussex, occurs the following inscription:

> "Vive diu, sed vive Deo: nam vivere mundo
> Mortis opus; viva est vivere vita Deo."

Nobody, not even the local clergyman, knew whence this curious couplet was derived, and it was regarded as original, but by chance I found it (with one word different) constituting a final exhortation at the end of a letter addressed to a certain Licentius (could he have threatened to become a *licentiosus*?) by Paulinus (*ca.* A.D. 354–431), bishop of Nola, who had been a favourite pupil of the poet Ausonius (see Migne's *Patrol.*, latin series, vol. 61, columns 181–184). Richard Garnett's sparkling epigram commencing "Thou art in danger, Cincius, on my word," which I have seen quoted as an original, is practically an English version of the Greek epigram attributed to Argentarius, in *Anthol. Grœc. Palat.*, 11, 28.

Though it has long become difficult to express any new idea on death (or on love), the brilliant language of an essayist like Hazlitt makes his writing delightful reading. In regard to the substance of the quotation in question, one may observe that the man who no longer fears death has ceased to be a slave (paraphrased from Montaigne). Though not everyone can become a quite free man in that sense, even then he may be able to prevent the fear of death from becoming a paralysing obsession—sometimes, at the very worst, not by facing the facts but by refusing to dwell on what he might regard as a dreadful necessity to which all living beings must submit. As a matter of fact, the latter course is often followed.

F. PARKES WEBER.

Harley Street, W.1.

BACTERICIDAL AEROSOLS

SIR,—Experiments carried out at Portslade since 1937 have led to certain conclusions about the prevention of air-borne infections by bactericidal aerosols. These should be most useful in relatively closed atmospheres. The germicide should preferably persist as a mist for at least as long as the time taken for one air change, and we shall be doing little of value unless rate of kill of pathogenic agent is quicker than rate of air turnover. During the winter months, when air turnovers are usually few and respiratory complaints frequent, a germicidal aerosol should be of more use than during the summer. For reasons which cannot be discussed here we consider that elimination of saprophytes from the atmosphere during our ordinary daily life is probably undesirable, and we therefore advocate the use of a germicide in a concentration which, while being lethal to pathogens, is relatively harmless to saprophytes. The killing rate will vary according to many factors, but the three fundamentals on which it is based are (1) nature of germicide mixture; (2) concentration of germicide mist; and (3) size of mist particles. The same three factors are also of importance in relation to duration of lethal effectiveness—i.e., persistence of the mist.

In the present state of our knowledge the four most promising germicides for use in aerial disinfection appear to be hypochlorites, resorcinol, hexyl resorcinol, and organic smokes. Many others have a high degree of activity, killing bacteria suspended in the air rapidly in low concentrations, but their host-parasite tolerance ratio is not wide enough to allow of their use in practice. In assessing the relative merits of these germicides the conditions under which they are going to be utilised must be specified. If we take for granted that the bacteria we are attempting to destroy come directly from the oral or nasal passages and that the infector and the potential infectee are present while the germicidal aerosol is being used, disinfection being more or less continuous, the experimental findings wherein broth emulsions of bacteria are used as test organisms give little information about the merits of the germicides concerned, and the best available substitute for diseased material has seemed to be atomised normal saliva or the like.

Either rapid or delayed aerial disinfection may be attempted. In the first the method is being pushed to its limits by using the maximum concentration of germicide compatible with safety, while in the second we are satisfied with some delay in destroying the bacteria and rely on moderately effective concentrations of the germicide.

A chemical germicidal aerosol must have the following characteristics.

1. It must possess high lethal effectiveness to lower organisms, and low lethal effectiveness to higher organisms—i.e., host-parasite toxicity ratio should be as low as possible.
2. It must be well tolerated by higher organisms; non-irritating externally or internally, preferably invisible, and sometimes preferably inodorous.
3. It must be harmless to inanimate receptors; non-corrosive to metals, non-staining to materials, non-bleaching and clean to use (low concentration in atmosphere).
4. It must possess high persistence.
5. It must be non-inflammable.

Hypochlorites are cheap and easily procurable. They are clean, and, when the concentration is not too high, impart to the atmosphere an odour which some consider distinctly pleasant. They are rapidly lethal to bacteria in the air, but the concentration of mist which has to be used in order to kill the flora of the saliva is about ten times as great as that required to exert a comparable effect on broth emulsions of ordinary stock laboratory cultures. Unfortunately it is on the latter type of organisms that the advocates of hypochlorites are wont to base their arguments. In our experiments we have mostly used 1% watery solutions of sodium hypochlorite containing about 16% of common salt and a little alkali to render the solution stable. Sodium chloride is, of course, corrosive to metals, while rendering the solution alkaline much reduces the lethal effectiveness of the solution to bacteria. The corrosive effect was partly overcome by diluting the hypochlorite solution five times with water, and this 0·2% solution of hypochlorite as a matter of fact proved more effective against the flora of the normal saliva than the 1% solution in a similar mist concentration in the air. Even so, in a concentration sufficient to be useful in combating the spread of air-borne infections the average person might be inconvenienced by the mist. Besides its effect on metals, we imagine that it might also have some bleaching effect on fabrics. Mists of hypochlorites lethal to bacteria in the air consist of relatively large particles. Large quantities of mist have to be utilised if the particles are very small or very large, and in both cases the "kill" falls off abruptly with time.

"*Aéryl*" germicide consists of 45% resorcinol in 5% watery glycol plus 0·5% of a green dye. It is extremely well tolerated—in effective concentrations it is odourless, tasteless and devoid of any irritating effects whatever. Like hypochlorites it is a rapid killer of bacteria in the air; it is probably somewhat more persistent and is practically non-corrosive. Its great merit is, however, that, unlike hypochlorites, its efficacy is apparently not damped by the presence of protein materials, the kill of the flora of the saliva being as good or better than the kill of broth emulsions of ordinary stock laboratory cultures. It is similar to hypochlorites in that the effective particle size of the mist is relatively large. The concentration of base as sodium hypochlorite in the one case and resorcinol in the other we recommend is 1 gramme per 1000 cu. metres of air, where atomisation is being carried out so as to give optimal bactericidal results.

"S^2" is a phenolic germicide consisting of 10% hexyl resorcinol in propylene glycol to which is added 0·05% of sulphonated lorol as wetting agent and sufficient caustic soda to make the concentration equivalent to N/100. The chief differences between resorcinol and hexyl resorcinol when used as germicidal aerosols seem to be these. (1) The activity of a solution of resorcinol in a polyhydric alcohol is enhanced if water is substituted for most of the alcohol, while the reverse is the case with a mixture of hexyl resorcinol and a polyhydric alcohol. (2) To obtain comparable results biologically resorcinol has to be about five times as concentrated as hexyl resorcinol. (3) With its higher concentration of germicide base aéryl is a quicker killer than S^2 and acts on the flora of the saliva relatively better than S^2. (4) Aéryl mists are much less persistent than are those of S^2; where a mist of aéryl may persist for minutes a mist of S^2 of similar particle size will persist for almost as many hours. This persistence is the chief merit of S^2 and allows of the utilisation of very small mist particles. A hexyl resorcinol mist is slightly more easily detected than one of resorcinol, but because of the smaller amount of germicide base that needs to be incorporated in the aerosol mixture and because the effective concentrations of mist are far lower than those of any other germicide tested, we consider S^2 to be a superior germicidal aerosol, and it is outstanding where a delayed but sustained action is aimed at. Owing to accidents which have happened in the past among workmen inhaling vapours of glycols there seems a tendency to class all substances bearing this name as dangerous, but we are satisfied that the toxicity of propylene glycol is very low compared with most other glycols. As regards the toxicity of hexyl resorcinol, if continuously inhaled in the concentrations we recommend the total amount involved per 24 hours cannot be greater than about 0·005 g., and the major portion of the germicide is not retained in the respiratory passages but is passed out in the expired air. During a working day of 10 hours the total amount of hexyl resorcinol available for absorption into the system would probably not be more than 1/1000th of the dose often given for therapeutic purposes.

Smokes.—This type of germicidal aerosol has the advantage that a large variety of organic substances can be used as raw material; they are cheap, and their generation requires no mechanical apparatus and no technical skill in operation. Their outstanding feature is that they are much more bactericidal in the air to the flora of the saliva than they are to broth emulsions of the several laboratory cultures tested, and if sterile saliva is added to the latter the sensitivity of the contained bacteria to the germicide is increased about ten times instead of being decreased as it is with hypochlorite, S^2, or ultraviolet light. A disadvantage of smokes is that their visibility seems to be greater than

that of the other three aerosols when they are used in an effective bactericidal concentration, and also that they are odoriferous and some of them may be a little irritating. The odour can be rendered pleasant by the judicious selection of the raw material, and in some situations may be useful for masking unpleasant odours. If the raw material chosen is a balsam most people will think the smell pleasant, and far from being irritating the smoke will produce the soothing effect on the mucous membranes which has been used to alleviate coughing for centuries. Smokes are more rapidly lethal than S² to bacteria, but their persistence is apparently nothing like so great. The concentrations given in the table are based on amount of crude material used, and not on the amount of smoke actually present in the air.

Number of cubic metres of air in which 1 *gramme of aerosol has been found to effect* (*a*) *a* 95% *kill of bacteria within* 15 *min., and* (*b*) *more than a* 50% *kill within* 30 *min.* The organism used was *Corynebacterium xerosis*. For technical reasons, the salivas were diluted with equal parts of water. About the same proportion of streptococci were killed as of other members of the flora. We imagine that the average pathogens in the air would be killed with even greater ease than their non-pathogenic counterparts.

Aerosol	Test material	Aerosol mixture		Bactericidal base	
		a	*b*	*a*	*b*
Smokes	B.e.	50	300	..	..
	Sa.	100	3000	..	..
Hypochlorite 1%	B.e.	15	20	1500	2000
	Sa.	1	5	100	500
Hypochlorite 0·2%	B.e.	100	..	50,000	..
	Sa.	2	4	1000	2000
Aéryl	B.e.	250	1000	500	2000
	Sa.	500	1000	1000	2000
S²	B.e.	4000	32,000	40,000	320,000
	Sa.	500	40,000	5000	400,000

B.e. = broth emulsion; Sa. = saliva.

As regards the present urgent need for treating the air of shelters we advocate without hesitation the burning of balsamic candles or the like, and even were we at peace smokes would be our first choice for putting to immediate practical test, chiefly because no mechanical appliances are necessary for their generation. Where suitable atomisers and air compressors are available S² would be our choice for dealing with confined spaces where air turnovers were at a minimum. In durability and stability coupled with demonstrable lethal effectiveness in almost astronomical dilutions in the air this germicidal aerosol is outstanding. There is every possibility that still more effective phenols of low vapour-pressure will be forthcoming when the chemists seriously turn their energies to the subject. Resorcinol and hypochlorites certainly have their merits, but in the particular field in which we are now interested they appear to us to be outclassed by smokes and hexyl resorcinol.

Portslade. C. C. TWORT.

THE SEDIMENTIN INDEX

SIR,—When, in my article of June 29 (p. 1160) I said "The sedimentin index gives the quantity of sedimentin in the *blood sample as a whole*," the operative phrase was the one now italicised. As Mr. Farmer points out in his letter of Dec. 28, the sedimentin content of a sample of blood rendered anæmic depends on the nature of the fluid which replaces the diminution in cell-volume; if this be an inert fluid (as in my dilution experiments) the plasma-percentage remains unaltered; if it be additional plasma (as in Fahreus's experiments) the plasma-percentage is increased, and of course the percentage of all the constituents of plasma, including sedimentin. But nobody bothers to correct their observations on blood-ureas, blood-sugars, &c. when anæmia is present; so why bother about correcting blood-sedimentin? Is it established that the former constituents of plasma permeate the intracellular fluid by virtue of their much smaller molecular mass, and are thus unaffected in their general diffusion by the presence or absence of cells?

Later in the same article, however, I admitted that correction "can be done by anyone anxious to think in terms of plasma-sedimentin instead of blood-sedimentin." He has only to multiply his observed sedimentin index by 58/100−x, where x is the cell-volume percentage (determined by centrifugalisation) and 42% is taken as the cell-volume of normal blood.

Other critics, whose taste exact for faultless fact amounts to a disease, have urged that a further correction is desirable in every observation, because the act of diluting 80% of whole blood with 20% saline-citrate anticoagulant reduces the sedimentin content by 20%, and therefore the observed index should be multiplied by 1·25. But surely if one is reckoning in units, it is immaterial whether the unit be eightpence or tenpence, so long as it remains constant?

Vale Royal, Cheshire. GEORGE DAY.

TREATMENT OF BURNS

SIR,—Among the many recent suggestions for the treatment of burns I have not seen any mention of Hebra's baths. Anybody who has been to the Allgemeines Krankenhaus in Vienna will know the Bath Station, where I saw many severe cases of burns treated with great success and the minimum amount of shock and discomfort to the patient. The initial outlay would not appear to be very great; all that is needed is an ordinary-sized bath where the patient is completely immersed in water kept at a suitable temperature and so regulated that the water is continually being changed. The patient rests on a kind of wire mattress which can be raised or lowered by pulleys as required. Antiseptics may, of course, be added to the water. The patient eats and sleeps and remains in the water as long as necessary. The baths are not solely used for treating burns, but also for certain skin diseases, biliary fistulæ, discharging bone sinuses and spinal injuries. Some of these cases I have known to have been in the water for more than two years.

A prescription I have found useful in clearing up some cases of burns where there is offensive slough is the following:—

℞ Argent. nit. 0.25
Aqua dest... 25
Ol. olivæ 25
Adeps lanæ 50
Sig. Apply on lint.

London, S.W.4. J. E. O'LOGHLEN.

"SCRIMSHANKING"

SIR,—During three years' service in the last war I spent two as M.O. to front-line troops, and after trial and error I gained a fair knowledge of the lead-swinger. Incidentally, this has proved invaluable in my frequent contacts with the known and the unsuspected neuropath. During my initiation I sent many a soldier to the trenches wrongly, and equally wrongly many another "down the line." A sergeant who did not know my profession told me recently that he could "put it over" any M.O. by chewing cordite. One heard much of this in that war and "D.A.H." was then a common diagnosis. It would be of considerable help to many of us if someone would describe further signs and symptoms of this form of poisoning, and perhaps enlighten us on other methods of scrimshanking.

The Manor, Epsom. D. R. ALEXANDER.

SHARING SAFETY

SIR,—Some of us who live in peace and safety are more than willing to share our good fortune with others less fortunate. In the area of the emergency hospital from which I write no bomb has been heard nor any siren—there is none nearer than five miles away. Some time ago I made a suggestion for a temporary interchange of personnel between quiet and busy areas; in due course I had a reply from the Ministry of Health that they saw no need for such action. It seems obvious that efficiency will be maintained best by arranging that busy men be moved periodically to areas where the work is light and rest assured. Perhaps, when this is brought to the attention of the Ministry, a system of temporary transfer of personnel can be instituted.

SURGEON, BASE HOSPITAL.

THE CHRISTMAS GIFT

SIR,—It is with great pleasure that I inform you that we distributed £1,032 in Christmas gifts this year. This means a monetary gift to all our regular beneficiaries—deeply appreciated and valued by each one of them. Will you please accept my warmest thanks for the help you gave in publishing my appeal and convey to your readers my sincere gratitude for their kindly and generous response.

I am sure that it is an encouragement to us all that the medical profession is so loyally supporting the Royal Medical Benevolent Fund and enabling the good work to be carried on at the present time when the hardships of many are very great.

THOS. BARLOW,
President, R.M.B.F.

Manorfields, S.W.15.

B.M.A. MEDICAL PLANNING COMMISSION

THE British Medical Association has set up a medical planning commission with the following terms of reference:—

To study war-time developments and their effects on the country's medical services both present and future.

Its constitution has now been announced, though 11 vacancies have yet to be filled.

DELEGATES

Officers of the B.M.A.—Thomas Fraser, president of the B.M.A., consulting physician to the Aberdeen Royal Infirmary; H. S. Souttar, chairman of council, surgeon to the London Hospital; H. Guy Dain, chairman of representative body, late chairman of insurance acts committee; J. W. Bone, treasurer, chairman of general practice committee; Peter Macdonald, deputy chairman of representative body, ophthalmic and aural surgeon to the York County Hospital; chairman of B.M.A. hospitals committee.

Royal College of Physicians of London—4 nominees to be announced later.

Royal College of Surgeons of England—Sir James Walton, London; Sir Alfred Webb-Johnson, London; 2 further nominees to be announced later.

Royal College of Obstetricians and Gynæcologists—3 nominees to be announced later.

Royal College of Physicians of Edinburgh—Charles McNeil, professor in child life and health in the University of Edinburgh.

Royal College of Surgeons of Edinburgh—Henry Wade, surgeon to the Edinburgh Royal Infirmary.

Royal Faculty of Physicians and Surgeons of Glasgow—John Henderson, consulting physician to the Glasgow Royal Infirmary.

Society of Medical Officers of Health—G. F. Buchan, Willesden; A. Massey, Coventry; a county M.O.H.

Faculty of Radiologists—1 nominee to be announced later.

Medical Women's Federation—Mona Macnaughton, Newcastle-on-Tyne; Doris M. Odlum, psychotherapist to the West End Hospital for Nervous Diseases and the Elizabeth Garrett Anderson Hospital.

Parliamentary Medical Committee—Sir Francis Fremantle, M.P. for St. Albans; and Haden Guest, M.P. for North Islington.

OTHER MEMBERS

F. M. B. Allen, physician to the Belfast Hospital for Children and member of council of B.M.A.

Sir Girling Ball, surgeon to St. Bartholomew's Hospital and dean of faculty of medicine of the University of London.

R. Mason Bolam, assistant to the skin department of the Royal Victoria Infirmary, Newcastle-on-Tyne, and hon. secretary of the North of England branch of B.M.A.

H. C. Boyde, hon. secretary of the Stratford division of B.M.A.

J. A. Brown, member of insurance acts committee of B.M.A. and chairman of Birmingham panel committee.

J. I. Cameron, hon. secretary of Glasgow division of B.M.A.

O. C. Carter, hon. secretary of Bournemouth division of B.M.A.

V. Zachary Cope, surgeon to St. Mary's Hospital and member of council of B.M.A.

C. D. Coyle, medical superintendent of Fulham Hospital.

W. Allen Daley, chief medical officer to the London County Council.

Lord Dawson, extra physician to the London Hospital and past president of Royal College of Physicians and of B.M.A.

J. W. L. Dickson, secretary of the Middlesbrough panel committee.

W. J. Dilling, dean of faculty of medicine and professor of pharmacology and general therapeutics in the University of Liverpool.

S. C. Dyke, consulting pathologist to the Royal Hospital of Wolverhampton and president of the Association of Clinical Pathologists.

Geoffrey Evans, physician to St. Bartholomew's Hospital.

R. G. Gordon, physician to the Royal United Hospital of Bath and member of council of B.M.A.

D. G. Greenfield, Rushden, chairman of conference of local medical and panel committees and member of insurance acts committee of B.M.A.

E. A. Gregg, member of council of B.M.A. and chairman of London panel committee.

Frank Gray, chairman of London Public Medical Service and member of council of B.M.A.

N. Bishop Harman, London, consulting ophthalmic surgeon to the West London Hospital and chairman of ophthalmic group committee of B.M.A.

Somerville Hastings, surgeon-in-charge of ear, nose, and throat department of the Middlesex Hospital and chairman of London County Council hospitals and medical services committee.

J. A. L. V. Jones, hon. secretary, Leeds public medical service; member of general practice committee of B.M.A.

J. M. Mackintosh, Edinburgh, late chief medical officer of the Department of Health for Scotland.

H. H. MacWilliam, medical superintendent of Walton Hospital, Liverpool.

Urban Marks, assistant physician to the Swansea Hospital.

C. G. Martin, London, hon. secretary to metropolitan counties branch of B.M.A.

A. F. Wilkie Millar, hon. secretary and chairman of Edinburgh and Leith Division and member of Scottish committee and insurance acts committee of B.M.A.

J. B. Miller, Bishopbriggs, Lanarkshire, chairman of Scottish colliery surgeons committee and member of council of B.M.A.

D. S. Murray, pathologist to the Royal Hospital, Richmond; president of Surrey branch of B.M.A. and editor of *Medicine To-day and To-morrow*.

R. L. Newell, assistant surgeon, Manchester Royal Infirmary; member of council and of hospitals and health services committees of B.M.A.

R. M. F. Picken, Mansel Talbot professor of preventive medicine in the Welsh National School of Medicine; member of council and chairman of public health committee of B.M.A.

Harry Platt, professor of orthopædic surgery in the University of Manchester.

S. Cochrane Shanks, director X-ray diagnostic department, University College Hospital, and president of Faculty of Radiologists.

R. G. Simpson, hon. medical officer to Wood Green and Southgate Hospital and chairman of North Middlesex division of B.M.A.

Sydney Smith, regius professor of forensic medicine and dean of faculty of medicine in the University of Edinburgh.

Donald Stewart, Birmingham, hon. secretary of the Association of Industrial Medical Officers.

S. Wand, Birmingham, member of council, insurance acts committee, and general practice committee of B.M.A.

A. S. Wigfield, Buntingford, hon. secretary to East Herts division of B.M.A.

Oscar Williams, Llanelly, member of Welsh committee of B.M.A.

David Wilson, ophthalmic surgeon to Torbay Hospital and member of ophthalmic group committee of B.M.A.

S. A. Winstanley, Urmston, chairman of Lancashire county panel committee and chairman of Manchester division of B.M.A.

The commission has power to coöpt additional members, and the Ministry of Health and the Department of Health for Scotland have been invited to appoint observers.

Dr. R. A. O'Brien, who joined the staff of the Wellcome Physiological Research Laboratories at Beckenham in 1910 and became director in 1914, retired at the end of 1940. Dr. J. W. Trevan, who became head of the pharmacological section in 1920, has been appointed to succeed him.

Obituary

THOMAS COLVIN

M.D. GLASG., J.P.

Dr. Colvin, who died suddenly at his home in Glasgow on Dec. 30, had practised for 45 years in the district in which he was born, the heart of the Irish Catholic colony. He was an enthusiastic worker in many Catholic activities in the city, having been a pioneer in religious youth movements, particularly the Catholic Young Men's Society of Britain. Later he became hon. life president of the Catholic Pharmaceutical Society of Britain; he was also a past master of St. Luke's Catholic Medical Guild of Britain. In recognition of his work among the people of the slums of the city, Pope Pius X, in July, 1923, created him a knight of St. Gregory the Great. At Glasgow University, where he qualified in 1893, he was one of the first Roman Catholic graduates; in surgery he was Sir George Macleod's last medallist and Sir William Macewen's first. He was also medallist in Sir William Gairdner's class. He was early attracted by public health, and in 1900 when bubonic plague broke out in the city it was he who identified the disease and wrote about it in our columns. Dr. Colvin, who was in his 79th year, is survived by his wife, a daughter and two sons, one of whom Dr. John Collier Colvin was his partner in practice.

WILLIAM WADSWORTH WILDMAN

M.B.EDIN., D.P.H.

SURGEON LIEUTENANT, R.N.V.R.

Dr. W. W. WILDMAN, whose death during November on active service in the Mediterranean was due to enemy action, graduated M.B. from the University of Edinburgh in 1931. A fellow student who was his partner in the dissection of his first anatomical part writes: Wildman was always liked by the rather small circle with whom he became intimate. Quiet and retiring, he took little part in the more boisterous undergraduate activities. He was always a conscientious student, but never obtrusively so. He also studied in Paris and later the hospital appointments he held included that of resident at the French Hospital in London. After a year in private practice he took his D.P.H. in 1935 and secured an appointment as R.M.O. at the Leicester Isolation Hospital and Sanatorium. In 1936 he was appointed assistant M.O.H. and assistant school M.O. for West Bromwich, and two years later he became assistant M.O. to the Norfolk county council and M.O.H. to the Downham and Marshland rural district and the Downham urban district. He volunteered for service as soon as war broke out and was mobilised on Sept. 23, 1939. He was 32 years of age and he leaves a widow and one child.

Bowes, Chatham

HELEN YOUNG CAMPBELL

L.R.C.P.E.

Dr. Helen Campbell who died at St. Andrews on Dec. 24 was for many years in charge of the infants' department of the City of Bradford, which developed under her guidance, with the coöperation of Mr. E. J. Smith and Mr. Thornton Pullan, from a few isolated "babies' welcomes" to a great municipal institution. She studied at the London School of Medicine for Women and at Newcastle-on-Tyne before qualifying in 1907, when she joined Dr. Anne Cleaver in practice at Johannesburg and at once began to consider the problem of safe childbearing in the remote parts of the veldt, setting out her experience in a book entitled "Practical Motherhood." Returning to England she worked under Ralph Vincent at the Infants' Hospital in Westminster until in 1911 she was invited to Bradford. Here with at first little professional support she trained a small band of highly competent workers and studied the health and antecedents of the young life attending welfare clinics in an industrialised community. For instance, the 2172 infants under observation during the year 1918 shared among them 14,289 diseases and defects, an average of nearly seven handicaps to each infant. Her annual reports contained investigations—clinical, pathological and sociological—into the causes at work in the antenatal period leading to these dire results, and a close analysis of the relative share of defectiveness and defective environment. It was, she felt, a disheartening task in the absence of access to a complete maternity department, but her work was crowned with a large measure of success and attracted the attention of welfare workers from all over the country and from many foreign centres. Her health broke down under the strain and some ten years ago she retired to St. Andrews where she continued to study and write. Her death was hastened by the effect of an air-raid.

ROBERT GEE STERLING

M.R.C.S.

Dr. R. G. Sterling, who died suddenly after a long illness at Ash Vale, near Aldershot, was the son of Canon Robert Sterling, M.B. Durh., founder of the first mission hospital at Gaza, Palestine. He qualified M.R.C.S. from the London Hospital in 1915 and served in the R.A.M.C. from 1916 until the end of the war, reaching the rank of captain. His father died in 1917 after having been made prisoner by the Turks when they occupied Gaza. The hospital was bombed by the British from the sea as the Turks were using it as an ammunition store. The war being over Sterling went out to Gaza with his family and a few friends and rebuilt the hospital stone by stone, re-naming it the Sterling Memorial Hospital in memory of his father. He remained as medical superintendent in charge of the 150 beds until a serious illness overtook his wife and he was obliged to return to England. Since 1931 Sterling was in practice at Ash Vale, where his straightforwardness and devotion to his patients endeared him to a wide circle. He is survived by his wife, who was a daughter of the late Rev. Greenway of Eldon, co. Durham. They had three sons and three daughters.

Colonel SYDNEY GEORGE BUTLER, who died on Dec. 22 at Hove, was a native of Walton, Lancs, and qualified from the London Hospital in 1897. Commissioned as lieutenant, R.A.M.C., in 1899 he took part in the relief of Ladysmith and actions at Spion Kop and Pieters Hill, receiving the Queen's medal with five clasps. In 1914 he went to France in charge of No. 3 Stationary Hospital and later became consulting surgeon to the British Army on the Rhine. He was awarded the D.S.O. for coolness and courage in collecting wounded under severe shell-fire.

CORRIGENDA.—In the obituary notice of Dr. William Wallace, F.R.A.M., on p. 826 of our issue of Dec. 28, lines 11–14 refer to another Dr. William Wallace, of 25 Newton Place, Glasgow, who has naturally read them in that context with astonishment. We tender him our sincere regret for the slip.

In the review of Sir Arthur Hurst's "Medical Diseases of War" on page 14 of THE LANCET of Jan. 4, we should have said that some fresh views on the neuroses had been written with the assistance of Dr. T. A. Ross.

In the New Year's honours list the Kaisar-i-Hind gold medal was awarded to William Patrick Smythe Mitchell, M.B.E., chief medical officer for Bastar State.

On Dec. 13 the Bath Medical Book Society held its hundredth annual meeting. The society circulates some of the more recent medical books among its 25 members, each of whom keeps a book for a fortnight and then passes it on. All the books are returned to the hon. secretary and sold at the annual meeting and the proceeds of the sale are used to buy books for the next year. The subscription, originally £1, is now only 5*s*, as the books usually fetch good prices. The present secretary, Mr. A. Leonard Fuller, F.R.C.S.L., has held office for 36 years, and much of the success of the society has been due to his unfailing energy and tact.

Medical News

University of Oxford

Miss Josephine Barnes has been appointed Nuffield assistant in obstetrics and gynæcology in the university.

Royal College of Surgeons of England

On Jan. 13, at 3 P.M., Prof. H. A. Harris will open a series of Hunterian lectures which will be held at 1, Wimpole Street, London, W.1, during January and February with a discourse on growth in general. On Jan. 14 he will speak on the anatomy and physiology of locomotion and posture, and on Jan. 15 on the inherent weaknesses of the human body with reference to orthopædic practice.

The other lectures are as follows :—

Jan. 20, Mr. L. E. C. Norbury, carcinoma of the rectum ; Jan. 22, Mr. Norman Capener, the lumbo-sacral joint ; Jan. 24, Dr. R. E. Smith, the undescended testicle ; Jan. 27, Mr. H. A. Brittain, the principles of arthrodesis ; Jan. 29, Mr. J. M. Yoffey, the flow of lymph from the nasopharynx, and the absorption of dyes, proteins, viruses and bacteria after nasal instillation ; Jan. 31, Mr. W. H. Graham Jessop, the surgery of the great omentum ; Feb. 3, Mr. F. Ronald Edwards, dried plasma ; Feb. 10, Mr. F. F. Rundle, the pathogenesis of thyrotoxicosis.

On Feb. 13, at 2.30 P.M., Prof. A. H. Burgess will deliver the Hunterian oration. His subject will be Charles White of Manchester. On Feb. 17, at 3 P.M., Dr. A. J. E. Cave will give an Arris and Gale lecture on the comparative anatomy and evolution of the paranasal sinuses.

The Nation's Health

Sir Wilson Jameson, chief medical officer to the Ministry of Health, has stated that risks to health will be at a maximum during the next three months.. We have been fortunate, he thinks, in that no severe epidemics have so far broken out among shelter users, and that no great spread of vermin has been detected by shelter nurses and doctors. Frequent personal washing and changing of underclothes are safeguards against vermin, and the boroughs are doing their best to persuade people to make full use of the public baths. Fifteen large disinfectors belonging to the Army Medical Department are being used in London to sterilise verminous clothing by means of hot air. Sir Wilson urges that those who can do so should bathe at home and bake clothing in their own ovens. He regarded dispersal as the best preventive measure against the spread of disease—dispersal from overcrowded areas and from overcrowded shelters, and dispersal within the shelters, to be achieved by providing bunks and encouraging sleepers not to lie too close together. He advocated the general use of masks in shelters and crowded places. Speaking of cerebrospinal fever he mentioned the brilliant effects of the chemotherapeutic drugs in reducing the fatality-rate to 5%.

At a meeting of the section of medicine of the Royal Society of Medicine on Tuesday, Jan. 28, at 2 P.M., Colonel Lionel Whitby and Dr. Janet Vaughan will open a discussion on the therapeutic value of transfusion of derivatives of blood.

On Wednesday, Jan. 15, at 1.45 P.M. at the Royal Society of Arts, John Adam Street, Adelphi, London, W.C.2, Dr. Irene Ward, M.P., will preside when Miss Caroline Haslett reads a paper on women in industry. Miss Haslett is adviser to the Ministry of Labour on women's training.

The eighth list of subscriptions to the Medical War Relief Fund brings the total amount contributed to over £13,900.

On Sunday, Jan. 12, at 3 P.M., Miss A. T. Alcock, play therapist at the Tavistock Clinic, will open a discussion on war strain in children—its manifestations and treatment. The discussion will be held at the clinic, at Westfield College, Kidderpore Avenue, London, N.W.3.

The New York State department of health has coöperated with the United States Army in providing chest X-ray facilities for the men called up under the Selective Service Act who are medically examined in upstate New York. Of the 1401 men examined there during the week of Nov. 25, 19 were found to have tuberculosis. None of the 19 cases had previously been reported in the state, and about half of the men required immediate hospital care. Practically none of them had symptoms which were sufficiently serious to prompt them to seek medical advice because of their physical condition.

Infectious Disease in England and Wales

DURING THE WEEK ENDED DEC. 7, 1940

Notifications.—The following cases of infectious disease were notified during the week : smallpox, 0 ; scarlet fever, 1597 ; whooping-cough, 2421 ; diphtheria, 1424 ; enteric fever 23 ; measles (excluding rubella), 14,147 ; pneumonia (primary or influenzal), 782 ; puerperal pyrexia, 111 ; cerebrospinal fever, 144 ; poliomyelitis, 18 ; polio-encephalitis, 2 ; encephalitis lethargica, 1 ; dysentery, 92 ; ophthalmia neonatorum, 80. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Dec. 13 was 1929, including : scarlet fever, 288 ; diphtheria, 307 ; measles, 778 ; whooping-cough, 86 ; enteritis, 27 ; chicken-pox, 188 ; erysipelas, 53 ; mumps, 31 ; poliomyelitis, 1 ; dysentery, 8 ; cerebrospinal fever, 30 ; puerperal sepsis, 8 ; enteric fevers, 7 ; german measles, 1 ; other diseases (non-infectious), 67 ; not yet diagnosed, 109.

Deaths.—In 126 great towns there was no death from smallpox or enteric fever, 1 (0) from scarlet fever, 13 (0) from whooping-cough, 12 (1) from measles, 35 (0) from diphtheria, 41 (1) from diarrhœa and enteritis under 2 years, and 42 (8) from influenza. The figures in parentheses are those for London itself.

Birmingham reported 5 deaths from diphtheria, Liverpool 4. There were also 5 deaths from whooping-cough at Birmingham and 5 from measles at Liverpool.

The number of stillbirths notified during the week was 159 (corresponding to a rate of 35 per thousand total births), including 7 in London.

Births, Marriages and Deaths

BIRTHS

HERTEN-GREAVEN.—On Dec. 30, at Buenos Aires, the wife of Mr. E. C. Herten-Greaven, F.R.C.S.—a son.

KING-TURNER.—On Dec. 26, the wife of Dr. C. J. King-Turner—a daughter.

LEWIS.—On Jan. 4, at London, Ontario, to Dr. Hilda Lewis, wife of Dr. Aubrey Lewis—a daughter.

MACKEITH.—On Dec. 13, at Brisbane, the wife of Lieutenant S. A. MacKeith, M.R.C.S., R.A.M.C., of Graylingwell, Chichester—a daughter.

RINKEL.—On Jan. 3, at Holt, Norfolk, the wife of Dr. Ronald Rinkel—a son.

ROBINSON.—On Jan. 4, at Burnham-on-Sea, the wife of Dr. J. N. N. Robinson—a son.

MARRIAGES

BAILEY—LESLIE.—On Jan. 4, at Harrogate, Gordon N. Bailey, F.R.C.S., Captain R.A.M.C., to Isabel Ray Leslie.

JOHNSTON—GIMSON.—On Jan 4, at Kensington, Colin McKie Johnston, M.B., to Elizabeth Caroline Gimson.

REID—MILNE.—On Dec. 21, at Ayr, Lewis MacDonald Reid, M.B., Lieutenant R.A.M.C., elder son of Dr. A. H. Reid, of Trinidad, to Mabel Margaret Milne.

ROGERS—WHELON.—On Jan. 1, at Bromley, Victor A. Rogers, M.B., Lieutenant R.A.M.C., to Daphne Whelon.

STEVENSON—DUKE.—On Jan. 2, at Cambridge, Claude M. Stevenson, M.D., to Johanna Duke.

WALKER—MEDD.—On Dec. 19, at Plymouth, Robert Bruce Walker, M.R.C.S., elder son of Dr. A. Robert Walker, to Rosemary Pretyman Medd.

DEATHS

BHABHA.—On Jan. 3 at Drakefell Road, S.E.14, Shapurji Dadabhai Bhabha, M.D.Brux., D.D., L.R.F.P.S.

BOWER.—On Dec. 31, at Stretton, Warrington, Harry Edward Bower, M.D. Edin., J.P., aged 74.

BUTLER.—On Dec. 29, at Hove, Sydney George Butler, D.S.O., M.R.C.S., R.A.M.C., retd.

HEWAN.—On Jan. 6, in Edinburgh, John Hewan, M.R.C.S.

HUMPHREY-DAVY.—On Jan. 4, at Ross-on-Wye, Herefordshire, Alfred Humphrey-Davy, M.D., M.Ch. R.U.I., of Bournemouth.

MCCREA.—By enemy action, Edward D'Arcy McCrea, M.D. Dubl., F.R.C.S., his wife, Edith Florence Willock McCrea, F.R.C.S.I., and their two children, Patrick and Gillian.

NICOLL.—On Jan. 2, at Wittersham, Donald Alexander Nicoll, M.R.C.S.

SPOWERS.—On Dec. 31, in Melbourne, Edward Augustus Spowers, M.D. Melb.

WOODHOUSE.—On Dec. 31, at Sidmouth, Cecil Woodhouse, M.D. Camb.

WRIGHT.—On Dec. 30, at Dalkey, Dublin, William McDowel Aikin Wright, M.D. Dubl., aged 88.

The distinguished service cross has been awarded to Surgeon Lieutenant John Thomas, M.R.C.S., R.N., and to Surgeon Lieutenant T. B. Fitzgerald, M.B. Birm., R.N.V.R.

In a recent casualty list it was announced that Lieutenant A. G. Hewer, M.R.C.S., who was previously reported missing, believed prisoner of war, is now known to be a prisoner of war.

Notes, Comments and Abstracts

WELFARE AND WAR

VOLUNTARY welfare organisations have not lost their opportunities as a result of the powers acquired by the Government to regulate industry. Mr. Bevin has made full use of existing bodies, and the 1940 report of the Industrial Welfare Society is an account of growing, not diminishing, activity. A scheme for training welfare workers was drawn up last January, in conjunction with the Institute of Labour Management and the Joint University Council for Social Studies. Many firms belonging to the society have volunteered to give a month's practical training to students in their welfare and personal departments, and the courses will be beginning shortly. Lectures have been given during the year to meetings of industrial workers, nurses, and university and school groups. The society has also been able to give help to the Ministry of Information about opinion in factories, and to supply articles to works journals dealing with general policy and censorship. The Ministry of Food has consulted the society about diet in canteens, and the Ministry of Health has found its coöperation valuable in organising the blood-transfusion service. In April the society carried out a survey, for the Board of Education, of facilities for the training, recreation and supervision of juvenile workers. Free concerts have been arranged in factories, and works musical societies have been brought into touch with professional musicians; concerts are now organised under the board's council for the encouragement of music and arts. The B.B.C. has been persuaded to provide "Music While You Work," and this has become very popular. A special inquiry was made into the effect of blackout and transport restrictions on health and safety, and lighting and ventilation have been discussed with the Industrial Health Research Board and the London School of Hygiene. The panel of trained welfare workers kept by the society has been revised, and now that new posts are being created the demand for qualified candidates will increase; many appointments have already been made from this list. The report criticises the position in ordnance factories, in some of which it seems welfare workers without previous experience have been appointed, while in others the salaries offered are not sufficient to attract experienced workers. The society looks forward to the early remedying of this defect when more trained workers are available.

MAN AND HIS NEIGHBOUR

PLATO, as Sir Arthur Keith [1] has reminded us, likened the noble youth to the well-bred dog; both should be gentle to their friends, he thought, and fierce to their enemies. Freud noted repeatedly the strange ambivalence of the human mind, which can love and hate not only different objects at different times but often enough the same object at the same time. Nor is it necessarily our enemies who come in for the full blast of our fierceness; our nearest and dearest enjoy their share. Sir Arthur sees the emotion of patriotism as one of nature's cleverer devices for ensuring survival of evolutionary units, and these units were at first tribal. Darwin, voyaging in the *Beagle*, had with him Jemmy Button, a native of Tierra del Fuego, who was to be repatriated, and Jemmy was a keen patriot, praising his own tribe and abusing others; yet when Darwin landed he found the Fuegans "miserable degraded savages," poor enough material for a patriot to boast about. Arguing from this, Sir Arthur Keith postulates a "frontier reflex" in man; at the frontier between tribe and tribe love changes to hate, kindness to cruelty and peace to pugnacity. The tribal communities of the prehistoric world have swollen into nations, and still they snarl at one another; the amalgamation of tribes has only given us modern warfare instead of the border raids which used to keep people "in a not unhappy state of chronic unrest." A warless world, he thinks, might hardly work; man is not happy when he sits back and takes his ease.

In a sense there will always be frontier reflexes. The woman introduced for the first time into a roomful of her husband's relations is likely to feel an atmosphere of heightened criticism, if not of hostility, and to experience similar defensive emotions herself. But surely they are indeed defensive and springing from dread of invasion or attack. To enter a roomful of foreigners is quite a different experience; it is to meet consideration, indulgence and a sincere attempt at understanding. Perhaps the tribes have now got so big that the only real opportunity for aggression is now in the home circle. Modern war has little to do with the emotion of hatred. And if nature fancies it to be a good device for preserving evolutional units, it is time she thought again.

1. *Rationalist Annual*, 1941, p. 7.

RETREAT

Two young Englishmen living in Paris volunteered as ambulance drivers in the French army at the beginning of the German invasion. In "The Road to Bordeaux" (Cresset Press, pp. 408, 8*s.* 6*d.*), C. Denis Freeman and Douglas Cooper admirably describe their day-to-day adventures. Their book is not only enthralling in its intelligently-observed and accurate detail but throws much light on the causes of the French collapse—above all on the "bogging" of the army in a horde of refugees who, in the absence of orders from above, were an easy prey to alarmist rumours. The medical services suffered from the inevitable "ordre, contre-ordre, désordre" of a rapidly retreating army but the authors emphasise that everyone was still full of fight when the armistice burst on the stunned nation. They themselves were forced by it to leave their unit hurriedly and escaped on the last boat leaving Bordeaux. This is their description of the traffic at the entrance to Auxerre. "Cars and carts were in a solid block, overriding the pavements, jammed tightly across the width of the road from house to house. It was like some fabulous, fire-breathing, gargantuan, malevolent monster. The body moved, perhaps at no more than two miles an hour, but it moved. At every little turning it seemed to throw out tentacles, absorbing into its heaving, jerking mass all the cars that stood tremulously on its fringes. It swept everything before it. The pedestrians ran among the cars, calling for lifts, holding up their worn-out shoes and showing their bleeding feet, in noisy appeal, like oriental beggars exposing their sores. . . . We had no option but to be swept into this awful thing."

A GOOD ADVENTURE BOOK

A LOT of people would say that there was more than enough adventure going on in the world today. But many children who are leading very sober lives and facing, according to peace-time standards, drab Christmas holidays, will welcome "They Wanted Adventure" (Cape. 7*s.* 6*d.*) by Mr. Kenneth McFarlane, a pseudonym thinly disguising a surgeon writing in collaboration with a friend. The heroes of the book, John and Anne, set off to spend a quiet holiday in a small fishing village on the west of Scotland, under the care of Miss Watkins, who proves herself one of the most redoubtable spinsters of Cathedral England. An obliging stranger gives them a preliminary lesson in jujitsu; their dog Simon, who also has a zest for adventure, chews through the painter, and hey presto they are adrift among the Hebrides finding unreal adventures among very real people. Marooned on a remote island they are soon on the track of a gang of German spies and a hair-raising time is had by all before the villains are brought to trial in Edinburgh.

The King has sanctioned the following promotions in, and appointments to, the Venerable Order of the Hospital of St. John of Jerusalem:—

As Commander—Major-General Norman Methven Wilson, M.R.C.S., I.M.S.; Colonel Hugh Stott, M.D., I.M.S.

As Officer—John Robert Summers Park, L.R.C.P.; Colonel William Calder Paton, M.B., I.M.S.; William Steven, M.B.; Sir Cedric Hicks, M.D.; Victor William Tighe McGusty, M.B.; Robert Barr MacGregor, M.B.; and Norman Jennings, M.B.

Appointments

O'FARRELL, P. T., F.R.C.P.I., D.P.H., D.T.M.: visiting physician to St. Vincent's Hospital, Dublin.
BENNETT, K. H., M.R.C.S., D.P.H.: asst. M.O.H. for Lambeth.
MANN, J. W., M.B. Aberd., D.P.H.: asst. M.O.H. for Lambeth.
POOLER, W. R. H., M.B. Camb.: examining surgeon under the Factories Act 1937 for Wellington, Salop.